THE IRON TRADE REVIEW

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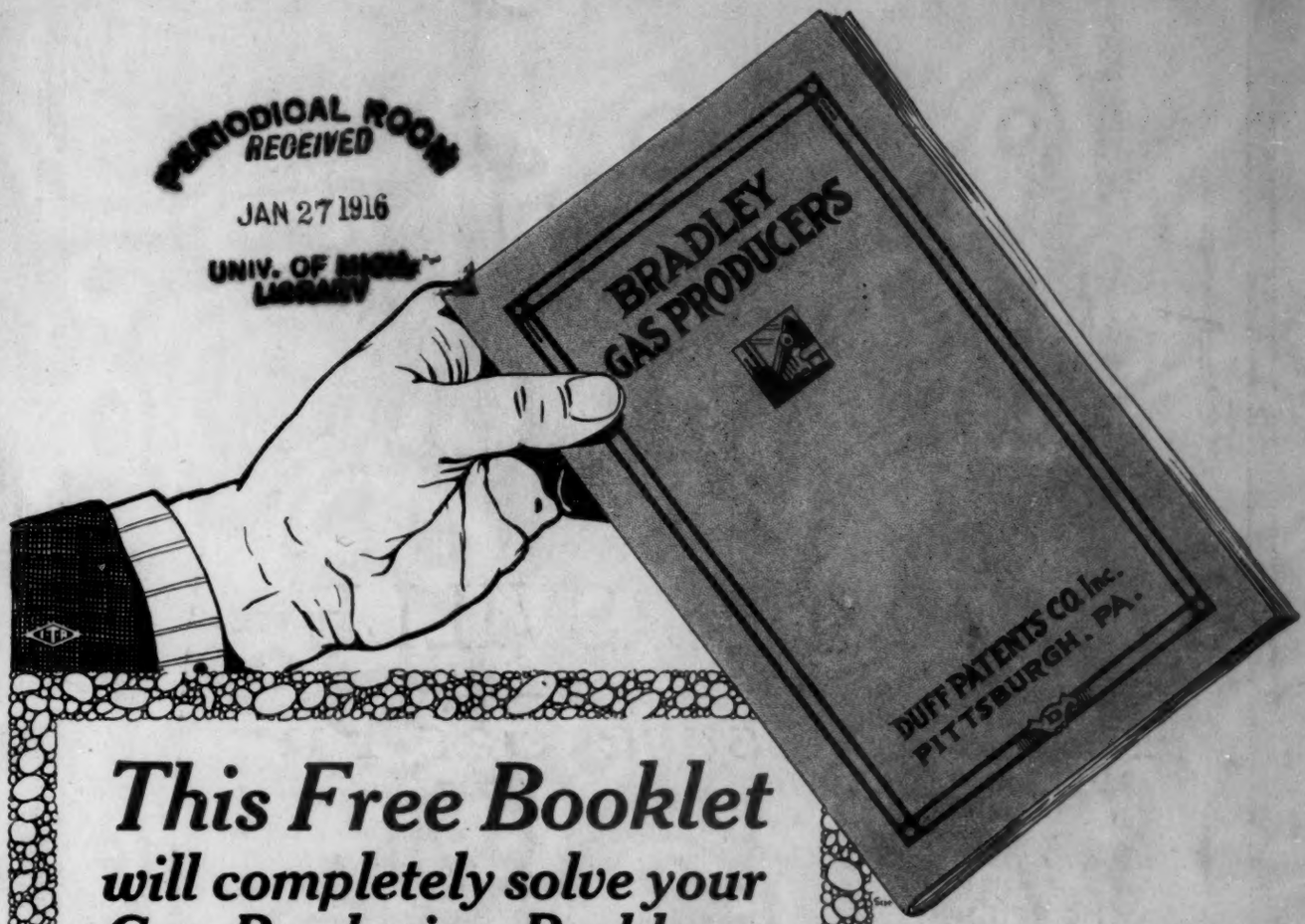

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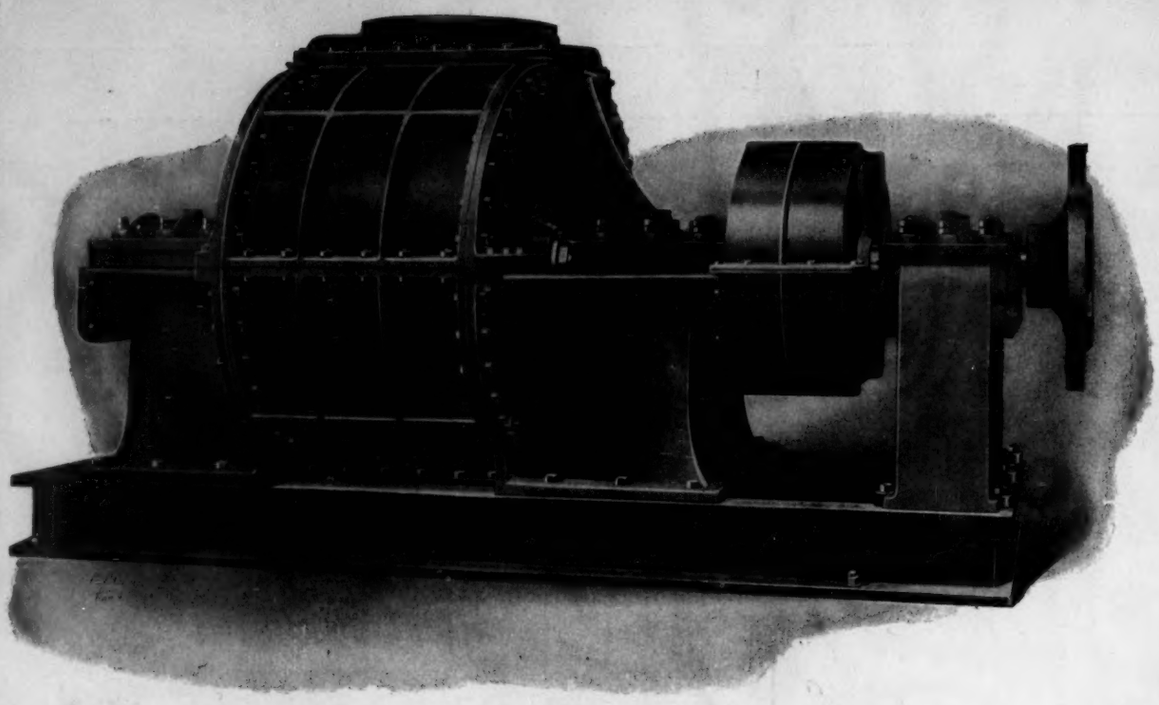

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THE IRON TRADE REVIEW

Vol. LVIII Cleveland, January 27, 1916 No. 4

Demand for Finished Lines Strong

And Price Advances Do Not Check Buying—Concessions Being Made by Some Pig Iron Sellers

THE demand for finished materials continues extremely strong and price advances do not check buying to any appreciable extent. In pig iron, however, a rather surprising weakness has developed and concessions are being made from what seemed to be well established prices in eastern territory and in the central west. Pig iron sellers seem to be willing to accept business at fair profits rather than lose any tonnage to competitors. These concessions are not, however, regarded as foreshadowing further weakness. The record-breaking showing of earnings of the Steel Corporation is all the more remarkable when it is considered in the light of the fact that the Corporation does not accept any premiums and has been very conservative in price advances on such leading products as shapes, plates and bars.

Pig Iron

The most interesting event in the pig iron market in eastern territory is the raising of the embargo on pig iron shipments by the New Haven lines. This has temporarily relieved the situation very much. The Western Maryland embargo which held up Virginia shipments has also been lifted. It is feared, however, that there will be such a rush of business that it may be necessary to order new embargoes. Some weakness in foundry grades has developed in the valleys and sales are being made on a basis of $18.50 for No. 2, valley.

Price Advances

An advance of $2 per ton on plain wire and nails, $5 on fencing and $4 on some other wire products makes the price of wire products the highest in 15 years. The tin plate market is very active and leading makers are quoting an advance of 25 cents, or $4 per box. Prices of shapes, plates and bars have been advanced in accordance with the policy announced by the Steel Corporation last week, but a very large percentage of the business of the independents is at premiums of several dollars per ton above the Corporation quotations. The coke market recorded a price of $5 per ton, ovens, for prompt furnace grades one day last week, owing to the car shortage, but the market quickly receded.

Billets

The starting of steel-making by the new plant of Corrigan, McKinney & Co., Cleveland, is an event of considerable importance in that district, as the new steel works will be a much needed source of supply to finishing mills. While it is understood that some tonnage of billets has been sold to manufacturers of munitions at very high prices, the firm has contracted for a considerable part of its output with local mills.

Bars

A new inquiry for 18,000 tons of large rounds has been sent out from Allentown, Pa., by a manufacturer of munitions and other large tonnages are pending. Automobile makers are active in trying to make contracts, but agricultural implement makers are not yet prominent and it is believed that at the end of the contract period, July 1, they will have considerable tonnages on hand, as the buying last year was very heavy.

Sheets and Plates

The demand for blue annealed sheets is still very active and prices are high. The starting of the Riverside plant of the Otis Steel Co., Cleveland, will relieve somewhat the situation as to blue annealed sheets in that district. Very high prices are being paid for plates. A leading eastern maker is selling at 3c, mill, and sales are being freely made by mills in the central west at from 2.75c to 3c.

Scrap

The sale of 10,000 tons of heavy melting steel has been made for shipment to Italy. The scrap market is dull in most parts of the country, but this condition promises to be only temporary and better prices are expected at an early date.

THE OPEN HEARTH

Strange Bedfellows: Sociologists and Saloonists

POLITICS is not the only thing that causes strange bed fellows. This fact is illustrated by the present attitude of some so-called sociologists and liquor dealers. Representatives of these two very different classes disagree radically with *The Iron Trade Review* as to the principal cause of the recent riot in East Youngstown.

In our issue of Jan. 13, we stated that we did not know whether the strike was instigated as a part of the foreign propoganda against American manufacturers of munitions, but it was clear that the trouble was caused by men of foreign birth, and that, while labor agitators were guilty of some meddling, the violence was due almost entirely to liquor, which flowed freely, while the mayor of East Youngstown refused for a time to close the saloons, in spite of the request that he do so made by the sheriff of Mahoning county.

We have received the following letter from the manager of the publicity department of the National Wholesale Liquor Dealers' Association of America:

Editor *Iron Trade Review:*

Confusing cause and effect, *The Iron Trade Review* has laid the blame for the East Youngstown riot at the foot of the liquor industry.

This is an injustice to the saloonist as well as a gross misinterpretation of the elements that lay behind the disorder.

The bulk of the rioters were men of low mentality, men whose intelligence was scarcely more than that of a child. They had become possessed of the firm conviction that they were being oppressed. Whenever an abtuse brain is seized with the idea of oppression, revolution and riot are sure to follow. Men of this character are not able to fight their battles intellectually and therefore rely upon the only means with which nature has endowed them, namely, brute force.

Ignorance and a feeling of oppression were the cause of the riot. Excess in this direction led to excess in drinking; then the saloons were closed.

At Pittston, Pa., a church riot recently occurred. One person was killed and many injured.

In character and violence this riot was similar to that of East Youngstown. Yet liquor played no part in this riot, but we do find the real cause, ignorance and a belief of injustice in attendance.

The Youngstown saloon was the victim of the mob's devastation and not the cause as some would have us believe, basing their argument on the fallacy that the mere presence of an institution is proof of its guilt.

CLINTON WUNDER.
MANAGER, PUBLICITY DEPARTMENT,
National Wholesale Liquor Dealers' Association of America.

301 United Bank Bldg.,
Cincinnati, Jan. 20, 1916.

We do not, of course, deny that ignorance and low mentality characterized many of the men who engaged in the riots, or that some of them imagined they had wrongs which needed redressing, but the evidence that the principal and immediate cause of rioting was excessive indulgence in bad whiskey is overwhelming. The agitation in regard to higher wages was entirely peaceful until the men began drinking and we are firmly of the opinion that if the saloons had been closed on Friday morning, Jan. 7, there would have been no rioting, no loss of property and no loss of life. It was not until crazed by drink that the men began to act like wild beasts. It is true that the saloons were victims of the mob's devastation, for 15 of the 19 were wrecked and looted and the stolen liquor added to the frenzy of the mob. But the saloons were the principal cause as well as the victims and will be held responsible by the people who know the facts.

So much for the assertions of the liquor dealers' association. Now, as to certain sociologists.

When the late federal commission on industrial relations was disbanded in accordance with the act of congress which created it, some of the members, especially the former chairman, Mr. Walsh, and others who had given expression to the most radical and unreasonable views, attempted to bring about a reincarnation of the commission to carry on its mischevious work of misrepresentation and abuse. For this purpose, a so-called industrial committee was organized and has since maintained a bureau at Washington. It is a mystery as to who foots the bills for this self-constituted body of mischiefmakers, but it has been able to make some alleged investigations and promulgate various documents. The last and most vicious of these deliverances are reports of alleged investigations of the Youngstown riots.

Among the allegations made by the so-called committee's report were the following:

Of all the significant facts disclosed by the investigation, the most important was the conclusive evidence that full responsibility for the situation there existing lies with the management of the United States Steel Corporation.

Reports which received credence in responsible quarters, came to the writer in Youngstown to the effect that officials of the Republic Iron & Steel Co. sought advice from Judge Gary immediately after the strike began, that he advised them to resist an advance in wages, and that later, realizing the danger of a general upheaval, he acted promptly to avert a strike and announced the 10 per cent increase, effective Feb. 1.

In response to an inquiry from *The Iron Trade Review,* Chairman John A. Topping, of the Republic Iron & Steel Co., states emphatically that the above allegations are false, as Judge Gary was not in any

THE OPEN HEARTH

way connected with the labor matters of the Republic Iron & Steel Co.

The Daily Iron Trade and Metal Market Report, commenting on these reports, after careful investigation at the time of the riots, says in part:

Unbridled indulgence in intoxicating liquor, combined with the utter incompetence of Sheriff J. C. Umstead, of Mahoning county, and of Mayor Cunningham, of East Youngstown, as to exercise of foresight and of presence of mind in emergency, caused the riots and murders in East Youngstown, still so fresh in the public mind. Any attempt to make the terrible affair an outgrowth of a labor difficulty is a deliberate endeavor to deceive. Every labor union leader who has anything like accurate knowledge of the affair will bear out the truth and accuracy of this statement.

Hence it is with amazement that we read the unblushing misrepresentations of one Manly and another West, both purporting to give the "inner side" of the occurrances in East Youngstown. Both have had the diabolical effrontery to write out their half-baked opinions and mail them broadcast to newspapers in the country which, most likely deceived by the heading "from committee on industrial relations, Washington," thought they were publishing official findings of a department of the federal government. Just a grain or two of truth were mixed in this bushel of misrepresentation, guess, half-truth and assertive and unsupported biased opinion to slick over the matter with a pale cast of probability. West wrote a violent diatribe against both the Republic Iron & Steel Co. and the Youngstown Sheet & Tube Co. which, as a general proposition, is utterly baseless and shows his ignorance of actual conditions not only in East Youngstown, but in any other steel town of the country. Manly since has issued a like screed in which he finds East Youngstown too small to engage his 16-inch guns, and turns his attention to the entire iron and steel industrial conditions both north and south, east and west. And a fine mess he makes of it, declaring with truth at a discount, that "Youngstown is simply the first eruption from an industrial volcano that has more dangerous craters." He goes even further and offers his solution boldly: "The whole mass is seething and strikes with ever increasing violence may be expected unless the pressure is relieved by a wage increase of not less than 20 per cent, a substitution of the 8-hour day for the inhumane 12-hour day, and above all, the elimination of the system of industrial terrorism which is now maintained by the so-called 'independents' as well as the trust to prevent orderly collective action on the part of the steel workers."

"The pressure" already has been relieved, first by the workmen becoming sober; second, by their employers paying them the expected wage advance to 22c an hour, an advance of over 12 per cent. The men are back at work and entirely satisfied.

One might go on indefinitely, showing how vicious and false are many other statements made by the Walsh agitators, but we believe that enough has been shown thoroughly to discredit the tirades issued by Manly and West. It is high time for the administration at Washington to suppress this mischief-making coterie, which has no legal existence and ought to be driven from the national capital.

An Irreparable Loss

ECONOMISTS and statisticians have been busy figuring the daily cost in treasure of maintenance, the losses in human life and capital and other aspects of the stupendous European war from the standpoint of tangible value. The result has shown such a vast sum measured by money standards and so appalling a destruction of the instruments and years-old accumulations of wealth, that the world stands aghast at the result and awaits with apprehension and grave uncertainty the eventual effect of these factors upon its general material welfare. The material and tangible elements of the present unparalleled strain upon the resources of the world may be measured with approximate accuracy by those skilled in such determinations. The dead, the crippled and the permanent defectives and the extent the world will be deprived of their services, also are possible of close analysis and estimate.

But over and above these manifestations of the savage vigor of the tremendous conflict, rises a factor all-important to the future of nations and peoples, yet at present indeterminable. This is the loss of trained and directing brain power among the executive, the organizing and creative classes; in fact, among the very mental dynamos of the various belligerent countries. This vital, dominating force in a nation's life, the product of long years of development, has been tapped and is ebbing away, an irreparable loss. This heavy drain continues, though the various nations, as the war has become prolonged, appear to have been awakened to a full appreciation of such a tragedy. In the early days of the war, men were sent to the front to fight and to die as mere units of soldiery and without regard to their abilities in the peaceful arts of trade and commerce. This sacrifice of indispensable talent now has been changed as far as circumstances have made it possible, but, necessarily, it remains a terrible menace to the future.

The extent to which the various countries have been able to conserve their resources in brain power and mental virility promises to determine the speed with which they can emerge from the chaos of destruction and despair at the conclusion of peace.

The index for Volume LVII of *The Iron Trade Review,* being for the last half of the year 1915, has been printed and will be sent to those who have received it in past years and to other subscribers who so request.

Prices Present and Past

Quotation on leading products January 26, average for December, 1915, average for October, 1915, and average for January, 1915. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Jan. 26, 1916.	Aver. for Dec., 1915.	Average for Oct., 1915.	Aver. for Jan., 1915.
Bessemer pig iron, Pittsburgh..	$21.45	$19.85	$16.95	$14.70
Basic pig iron, Pittsburgh.....	18.95	18.55	15.95	13.45
No. 2 Fdy. pig iron, Pittsburgh	19.45	18.85	15.57	13.70
Northern No. 2 Fdy., Chgo....	18.50	18.10	14.44	13.00
Lake Superior Charcoal, Chgo..	19.75	19.15	16.25	15.75
Mall., Bess., Chgo.....	19.00	18.10	15.12	13.00
Southern No. 2, Birmingham...	14.50	14.13	11.75	9.50
Southern Ohio No. 2, Ironton..	18.00	17.00	14.88	12.75
Basic, eastern Pa.....	19.50	18.00	17.50	13.50
No. 2X Virginia furnace.....	18.00	17.00	14.00	12.50
No. 2X foundry, Philadelphia...	20.00	19.25	15.00	14.25
Ferro mang., Balti.....	125.00	100.00	105.00	68.00
Bessemer billets, Pbgh.....	34.00	29.60	25.50	19.50
Bess. sheet bars, Pbgh.....	34.00	30.80	25.50	20.00
Op.-h'th sh. bars, Pbgh.....	35.00	30.80	26.50	20.00
Open-hearth billets, Pbgh.....	35.00	30.20	26.50	19.50
Steel bars, Chgo.....	2.29	1.97	1.59	1.29
Steel bars, Pittsburgh.....	2.00	1.74	1.41	1.10
Iron bars, Philadelphia.....	2.259	1.959	1.559	1.10
Iron bars, Cleveland, local del'y.	2.25	1.75	1.39	1.15

	Prices Jan. 26, 1916.	Aver. for Dec., 1915.	Average for Oct., 1915.	Aver. for Jan., 1915.
Iron bars, Chgo. mill.....	$1.75	$1.70	$1.37	$0.98
Beams, Chgo.	2.29	1.97	1.59	1.29
Beams, Pittsburgh	2.00	1.959	1.41	1.10
Beams, Philadelphia	2.159	1.959	1.609	1.25
Tank plates, Pittsburgh.....	2.10	1.74	1.42	1.10
Tank plates, Chicago.....	2.44	1.97	1.55	1.28
Tank plates, Philadelphia.....	2.409	1.759	1.609	1.25
Sheets, blk., No. 28, Pbgh.....	2.60	2.54	2.05	1.80
Sheets, blue an., No. 10, Pbgh.	2.50	2.23	1.60	1.30
Sh., galv., No. 28, Pbgh.....	4.75	4.75	3.50	2.77
Wire nails, Pittsburgh.....	2.20	2.02	1.76	1.55
Connellsville fur. coke, contr...	2.50	2.35	2.25	1.69
Connellsville fdy. coke, contr...	3.50	3.00	2.48	2.25
Heavy melting steel, Pbgh.....	17.50	17.50	14.00	11.62
Heavy melting steel, east'n Pa..	17.00	16.00	15.00	10.00
Heavy melting steel, Chgo.....	15.50	15.40	11.56	8.87
No. 1 wrought eastern Pa.....	22.50	20.00	16.00	11.75
No. 1 wrought, Chgo.....	15.50	15.15	10.68	8.81
Rerolling rails, Chgo.....	17.50	16.70	13.15	9.50
Car wheels, Chgo.....	14.25	14.75	11.75	10.00

(For Additional Prices See Page 264.)

Price Shading in Pig Iron Sales

Concessions Made in the East and Pittsburgh Develops Weakness in Foundry Grades

Philadelphia, Jan. 24.—Small sales and a lack of general buying still mark the course of the pig iron market in eastern Pennsylvania and adjacent territory. Sizeable tonnages which are appearing rarely have developed, in some cases, more animated price shading than the market has witnessed in some weeks. These instances, however, are regarded as isolated ones and do not indicate any actual weakening of conditions. A fair tonnage of eastern Pennsylvania No. 2 plain for early and last half shipment was sold in the week to a Lehigh valley buyer at a furnace range of $18.45 to $18.65, whereas, most makers recently have been naming $19 to $19.50. The Philadelphia market for No. 2X continues well represented at $19.75 to $20.25, delivered. Some sellers report a fair total of week's bookings in foundry and charcoal, including one lot of 1,500 tons. A Delaware river pipe maker bought 5,000 tons of eastern Pennsylvania pipe forge for comparatively early delivery at about $18.50, delivered. In Virginia, the Virginia Iron, Coal & Coke Co. has advanced first quarter prices 75 cents and second quarter 50 cents to a flat basis of $18, furnace, for No. 2X, $17.75 for No. 2 plain, $17.50 for No. 3 and $17.25 for No. 4 and forge. The last half schedule remains unchanged at the same figures as first and second quarters. Unfilled orders in Virginia have continued to increase and now are reported to be over 300,000 tons. Steelmaking irons are dull in this market. There is some talk that a large buyer of basic, who requires about 50,000 tons a quarter, is about to act on his third quarter requirements, but nothing definite has developed. Basic is about $19.50, delivered, eastern Pennsylvania. Low phosphorus is quiet and new sales total only about 1,000 tons. Prices are unchanged. A New York state furnace which is about to make special bessemer has sold 5,000 to 6,000 tons, partly for export, for later delivery. A Baltimore buyer took 700 tons of forward malleable. Lifting of freight embargoes for eastern delivery by the New Haven and other railroads, seems to have cleared up the situation considerably and beginning today iron is moving more freely.

Buying Movement Near

Buffalo, Jan. 25.—Indications point to the nearby development of a stronger buying movement, following the natural relaxation that has existed over a considerable portion of this month in consequence of the heavy demand for pig iron that occurred in December. During the past week, a good demand has appeared for iron for delivery over the third and fourth quarters of the year.

The furnaces of the Buffalo district all report that the consumption on the part of melters is steadily increasing and the calls for prompt shipment tonnages are filling up the little remaining untaken capacity of the producers over the first half of the year. The gradual lifting of embargoes on the part of eastern roads has caused a marked increase in the volume of material going forward upon urgent specifications.

Prices remain exactly as quoted a week ago, but slightly firmer for both first half needs and for deliveries over the remainder of the year.

Foundry Prices Weaken

Pittsburgh, Jan. 25.—Foundry pig iron has registered a decline of 50 cents a ton as a result of a sale recently made by a Cleveland blast furnace interest to a manufacturer of rolling mill equipment in this district. The iron involved, readers of *The Iron Trade Review* will recall, was sold at $19.25, delivered. Outside foundry iron has been offered this week at

(*For complete prices see page* 264.)

$18.50, valley, or $19.45, delivered. Malleable pig iron has not been affected.

Except for several foreign inquiries involving approximately 12,000 tons, the market for steelmaking grades is quiet. An eastern interest is negotiating for 2,000 tons of bessemer iron a month for shipment over an indefinite period to France, and another concern has sent out inquiries for 4,000 tons of bessemer for delivery the next 60 days to France. Italian interests are endeavoring to obtain 6,000 tons of basic iron for nearby shipment. A local melter has just closed for 1,000 tons of standard bessemer at $21, valley. Basic iron is decidedly quiet; no inquiry is reported and no important sales have been made for more than 30 days.

Some blast furnace plants were threatened last week when shipments of coke became irregular and uncertain. For several days, it appeared as if a dozen or more stacks would be forced to bank, awaiting the arrival of fuel.

Brisk Buying at Cleveland

Cleveland, Jan. 25.—There has been rather brisk buying of pig iron for the last half of the year. One Cleveland firm has sold 125,000 tons this month. Another Cleveland seller sold 7,000 tons to a northern Ohio foundry interest last week at $18.50, Cleveland furnace. Moderate tonnages of southern iron are being sold in territory along the lakes and in western New York on the basis of $15, Birmingham, for No. 2 for first half, and $15.50 for last half.

Lull at Chicago

Chicago, Jan. 25.—Buying of pig iron from Chicago makers is in small volume and principally for early delivery. Some melters, who had covered their expected requirements for first quarter and first half, find they need more iron than they had estimated and frequent requests are made on sellers for additional tonnages for prompt delivery.

It is significant that iron for early delivery is more active than for last half and indicates that melters will deal with conditions for second half at a later period even in face of full expectation that quotations will be higher than at present.

Prices remain firm and unchanged at $18.50, furnace, for No. 2 foundry, and $19 for malleable.

The situation as to Lake Superior charcoal iron is unchanged, some sellers quoting from $19.75 to $20.75, Chicago, for the range of grades, while one maker continues to quote $21.25 to $22.25, delivered, Chicago, which reflects the sold-up condition of its furnaces.

Southern iron is quiet and unchanged, first half iron being available at $14.50 to $15, Birmingham, for No. 2 foundry, and last half prices ranging from $15 to $16.50, Birmingham. The same situation as to last half buying seems to prevail as in the case of northern iron and few buyers care to cover their requirements so far in advance at present prices.

Quiet at Birmingham

Birmingham, Ala., Jan. 25.—Sales the past week were even lighter than the previous week. One concern reports the sale of 200 tons, another 900 tons and another 750 tons; 2,000 to 3,000 tons will cover all sales made. One interest reports a pending lot of 3,500 tons which will probably be let the early part of the week. While buyers seem to be content with letting matters "rock along", the furnace companies seem to be somewhat relieved of a strain. It has given them time to clean up a little. Buyers were rushing them vigorously for shipment of iron bought; the railroads were slow in furnishing equipment; so there was a consequent congestion. While prices have shown no tendency to go higher, they are pretty firm at $15.50 for first half and $16 per ton for last half delivery. By Feb. 1 two more furnace stacks will be in blast, augmenting the output 12,000 to 15,000 tons per month. Sales of special high manganese, low phosphorus iron were made during the week at $17.50 per ton at the furnace. One interest also reported that during the week it had received several letters requesting the holding up of shipments of iron on contracts. The southern foundries, as a rule, are not too well stocked for current needs—especially some of the pipe plants. It is reported that one or two of these large concerns will be in the market by Feb. 15 to March 1 for even second quarter iron. This reflects, in a measure, the uncertainties that the foundrymen entertain. Three of the Birmingham foundries have recently received contracts for 250 to 300 lathes for foreign and domestic use.

Basic Bought at St. Louis

St. Louis, Jan. 25.—Sales of iron last week included 10,000 tons of basic to one local concern, 1,000 tons of malleable, 500 tons of southern No. 2, a small amount of charcoal iron, 200 tons of Virginia grades, 500 tons of northern, and scattering orders, amounting probably to another 1,000 tons, for the most part southern grades. The inquiry in the market today is extremely light, but prices are firm. Southern No. 2 is stiff at $15 to $15.50 for first half delivery, with prompt shipments held strong at $16, Birmingham. A small amount of southern No. 2 recently was sold at $16 for last half delivery. Northern iron is quoted at $18.50 to $19, Chicago, and $18 to $18.50, Ironton. Ferro-manganese iron has risen to $150 a ton, seaboard.

Pig Iron Slow

Cincinnati, Jan. 25.—The pig iron market is moving along in an even way, with very few developments from week to week. Sales are light and are mostly for northern iron. Southern grades are moving very slowly. Recent inquiries include 1,000 and 500 tons of northern foundry iron from southern Ohio melters. The only recent sale of importance was made to a central Ohio user for 1,500 tons of northern iron. Prices are stationary and strong. Southern No. 2 foundry is quoted at from $14.50 to $15, Birmingham basis, for the first half, and from $15 to $15.50 for the second half. Southern Ohio No. 2 foundry iron is given at $18, Ironton basis, for the entire year. Jackson county and Ashland, Ky., silvery iron is quoted at $25, furnace, for 8 per cent silicon.

Railroad Situation Improves

New York, Jan. 25.—With the lifting of the embargo on pig iron by the New Haven railroad, by the Pennsylvania railroad against the former system, and by the Boston & Albany road, the way has been cleared for the resumption of shipments into New England districts which have been severely affected in recent weeks by the freight suspension. These developments have improved the situation, especially to New Haven delivery points, where the position of melters on supplies of iron and coke recently has been precarious, causing the shut-down of several plants. The New Haven coke embargo was raised some days ago. It is feared in the trade, however, that such a rush of freight will come forward during the next few days that the New Haven and other receiving lines will not be able to move it promptly, leading to new congestion and to the restoration of embargoes. Buffalo, at present, has the Pennsylvania route open into New England. In the New Jersey tidewater zone, iron melters are getting in shipments by several lines, but Brooklyn and Long Island points have been embargoed on iron and coal except on shipments originating on the Pennsylvania railroad. Freight

(*For complete prices see page* 264.)

conditions have absorbed the attention of the trade to the exclusion of new business and the market has been quiet. For that reason, a 3,000-ton purchase of No. 2 plain by an Easton, Pa., machinery manufacturer at comparatively low prices, has attracted considerable attention. This buyer took 1,000 tons of this grade for early shipment at $18.82, delivered, and 2,000 tons for last half at $19, delivered, two eastern Pennsylvania furnaces taking the business. The Port Henry furnace, which is soon to make special bessemer, has disposed of 5,000 to 6,000 tons of this grade. Tidewater prices are unchanged at $19.75 to $20.25 for No. 2X. In the export market, Spain has asked for 1,000 tons of malleable and sizeable lots of hematite and steel-making irons are pending for France and Italy. The continued embargo by the railroads on export freight for shipment out of Atlantic ports, ties up these matters.

Corrigan-McKinney Billets

Are Being Sold for Export and Will Also Be Taken by Cleveland Consumers

Cleveland, Jan. 25.—Corrigan, McKinney & Co., whose steel plant began pouring steel Jan. 20, expects to be turning out slabs, sheet bars and billets by March 1. It is understood that some high carbon billets have been sold for export at about $75 per ton, but the new Cleveland plant will not sell all its output by any means to manufacturers of munitions, but will be a source of greatly needed supplies for Cleveland mills. At least one important contract of this kind for a long period has been made.

Strong But Inactive

Pittsburgh, Jan. 25.—Prices of semi-finished steel products continue their march toward higher levels. An occasional rumor of sales of billets at as high as $45 a ton is heard, but it is a question whether sales made the last month or six weeks reflect the position of the market. Bessemer billets and sheet bars are being held at $35 a ton and open hearth products at $36 a ton by some makers. Wire rods are nominally quoted at $50 a ton.

Billets Clogged by Tonnage

Philadelphia, Jan. 24.—Numerous inquiries for semi-finished steel, some of them of attractive tonnage, fail to elicit quotations or much interest among sellers in this district, as so many of these producers are sold up for first half and decline to quote beyond. Were they to quote at present, important eastern makers stated their prices would be from $42 to $45, mill, for rerolling and $55 to $60, mill, for forging billets. Surprising prices have been obtained by the mills on odd lengths and analyses of billets which had been accumulated at their plants and now are being offered. Despite its irregular character, buyers have snapped up this steel at practically the seller's own price. An interesting development in the present paucity of semi-finished steel is that makers are re-cropping by 10 per cent, the 25 per cent crop originally taken on forging billets and are selling this steel at near the top prices. A good many foreign inquiries come up regularly including in the week 2,000 tons of billets and 2,000 tons of sheet bars and other lots for English buyers. Nova Scotia mills have been offering some billets in eastern territory at about the domestic quotations. It develops there is considerable price range in the wire rod market and makers have varied their quotations in accordance with the market obtainable by the buyers for the finished product in which they are to be used. The spread has been from about $42 to $55, Pittsburgh.

Cold Rolled Strip Steel

Pittsburgh, Jan. 25.—Manufacturers of cold rolled strip steel products, who last week announced that an extra of 15 cents for boxing material had gone into effect, now are making a charge of approximately the same amount for burlapping their product. It is not unlikely that the extra for boxing will be advanced to 20 cents per 100 pounds at an early date. Manufacturers are asking 4c base and above, although the bulk of the material is being sold at 4c base.

Plant Sold.—The plant of the Sligo Iron & Steel Co., Connellsville, Pa., has been sold to the Sligo Steel Co., Pittsburgh, which was recently incorporated with $750,000 capital stock. It is understood that equipment for the manufacture of steel railroad ties will be installed. George Frankovitch, John Robinson and A. L. Allen, of Pittsburgh, are interested in the undertaking.

(For complete prices see page 264.)

Coke Prices

Ascended for a Day to Highest Figure Since 1912.

Pittsburgh, Jan. 25.—Kaleidoscopic changes in prices have featured the market for Connellsville blast furnace coke for prompt delivery the last 10 days. During the greater part of last week, the supply of railroad cars fell to below 50 per cent of normal and many blast furnace plants were threatened with an actual shortage of fuel which would have necessitated the banking of fires. The Western Maryland railroad last Friday declared a strict embargo against the shipment of coke east of Connellsville and other eastern carriers have not been accepting anything like normal tonnages for eastern movement. Some coke shipped as long ago as Dec. 22 is just beginning to reach its destination in the east, where traffic conditions have been congested for many weeks.

As the car situation became more acute, prices of fuel last week advanced steadily, reaching a $5 basis on Friday, only to drop $1.50 a ton the following day. Coke had not sold at $5 a ton since 1902. While not much fuel was purchased at that figure last week no trace of lower quotations could be found last Friday. In their scramble for requirements, consumers, who generally use Connellsville coke, entered the markets of Wise county and Tennessee in order to cover needs.

Conditions yesterday became more nearly normal, with spot furnace coke selling at a spread from $3.50 to $3.75, ovens. Production for the week ending Jan. 15 was 420,521 tons, a decrease of 9,447 tons, compared with the week previous, according to figures compiled by *The Connellsville Courier.*

Southern Coke Steady

Cincinnati, Jan. 25.—Southern coke prices have not been affected by the fluctuations in the Connellsville district, and are steady and unchanged. Sales are light, being limited almost wholly to small spot lots, but deliveries on old contracts are heavy on both furnace and foundry grades. Production in January will exceed that of last December in the Wise county, Pocahontas and New River districts, as more ovens are being blown in, and labor conditions are better in a few localities.

Steel Bars for Munitions

Are Still Being Inquired for in Large Tonnages, But Foreign Buyers Not Willing to Pay Prices Asked

Philadelphia, Jan. 24,—An Allentown, Pa., munition manufacturer has put out a new inquiry for 18,000 tons of 3⅞-inch rounds for February-March delivery. An indefinite tonnage of 6-inch rounds also has been offered to sellers in this district by interests which are figuring on embarking upon the manufacture of shells. The Delaware Steel & Ordnance Co., which is remodeling the old Wilmington, Del., steel works for early operation, is credited with having in hand 100,000 tons of large rounds and shell billets for five to six months delivery, starting about March. There still is an absence of any important last half contracting in shell steel. The foreign governments are not willing to pay the prices quoted. Some makers also are not anxious to obligate themselves on much tonnage after July until they are better able to gage the requirements of their regular domestic trade for last half. A number of the domestic buyers of ordinary steel bars are trying to place contracts for third quarter or last half, but most of the mills do not care to quote in view of the tonnage they must carry past July. Third quarter contracts at the Steel Corporation's new price of 1.90c, Pittsburgh, apparently are not being actively solicited. An inquiry for 400 tons of shafting was passed by makers this week.

Steel Bar Situation Acute

Chicago, Jan. 25.—An advance of $1 to $2 per ton on steel bars was registered during the past week. The nominal quotation a week ago was 2.04c, Chicago, and this has been advanced to 2.09c, Chicago. Premiums asked by middle west mills still able to furnish some tonnages for reasonably prompt delivery have been advanced an equal amount.

Agricultural implement makers, who ordinarily contract prior to July 1 for the succeeding 12 months, are beginning to take an interest in the situation and wonder where they will obtain their supply for the next period. The conviction grows that long before July 1 approaches mills will have no steel to sell for delivery during the present year, and makers of farm implements realize their chance of contracting under the usual conditions is growing less.

It is believed that tonnages bought last year for delivery over last half and first half of this year were in excess of demands and that considerable of this material will remain in the hands of consumers when the contract period ends. This was bought at 1.39c to 1.44c, Chicago, and probably every ton on contract will be specified, as the spread between those prices and prices prevailing now is too great to disregard.

Hard steel bars rerolled from rails have been advanced $1 per ton and now command 1.90c, Chicago. Some mills situated further east have been able to obtain an even higher price and every expectation is expressed that demand for this steel for reinforcing in concrete work will bring about a further advance early in the spring.

Buyers are Active

Cleveland, Jan. 25. — Automobile makers and other users of bars, not including agricultural implement makers, are very active in endeavoring to make contracts to cover their requirements and are being quoted 1.90c for third quarter by leading companies. Agricultural implement manufacturers are not yet actively inquiring. They do not usually come into the market until March or April.

Anxious to Buy

Buffalo, Jan. 25.—Consumers seem to be anxious to get the mills and agencies of the Buffalo district to open their books for third and last quarter business, but the producing interests are declining to consider such offers, and there exists but little or no tonnage for delivery over the first half. The sold-up condition of the mills, in some cases to a greater degree than has occurred in a long period, is causing much trouble. Sellers adhere to the attitude of not wanting to commit themselves as far ahead as last half needs.

Bar Iron Advances Sharply

Chicago, Jan. 25.—An advance of $1 to $3 per ton on bar iron has been registered by Chicago mills, following the greatly increased strength of this product in the east. Last week, bar iron could be contracted at 1.80c to 1.85c, Chicago mill, but now 1.90c, Chicago, is the minimum quotation and on some tonnages as high as 2.00c, Chicago mill, is being asked and received.

Bar iron makers have believed for some time that demand would come in sufficient volume to warrant a higher level of prices and for that reason have been averse to taking on tonnages for future delivery. As a result, most mills have practically no tonnage for delivery beyond Feb. 29 at former prices. Indications are that further advances will follow within a comparatively short time, as users of iron bars find their business increasing heavily, and also that they must use some iron bars in place of steel bars, which are practically unobtainable.

Wagon makers in the west recently held a convention at Kansas City and found that business booked at the time of the meeting and exhibition was practically three times the quantity taken under the same circumstances a year ago. This indicates that demand for bar iron from wagon makers will be much heavier than last year.

Bars Advanced $1

Pittsburgh, Jan. 25.—The Carnegie Steel Co. and other manufacturers last Thursday advanced the price of steel bars $1 a ton to 1.90c for delivery at the convenience of the mill. Some tonnage, however, is being booked for third quarter delivery for specific work at that price. It is not unlikely that both bars and structural shapes will be advanced $2 a ton at an early date, since demand for bars and shapes is equally as heavy as that for plates, which now are held at 2c. Iron bars are being quoted at 2.10c and above.

Shafting Advanced

Pittsburgh, Jan. 25.—Several makers of cold rolled steel shafting have advanced prices to 40 per cent off the list for carloads and 30 per cent off the list for less than carloads. The adoption of these prices increases the differential for small tonnages 5 points. Manufacturers have discouraged, so far as possible, the buying of material in less than carload tonnages. Shafting is being sold from warehouses at from 15 to 25 points off the list. Makers are unable to promise shipments from mills in less than from four to seven months.

Hoops and Bands

Pittsburgh, Jan. 25.—The Carnegie Steel Co. has advanced its prices of steel hoops $2 a ton to a minimum of 2.10c and bands are held at 1.90c, or $1 a ton above the previously prevailing price. Demand for both products is heavy and shipments are deferred from two to five months.

The Caldwell Chemical Co., Evansville, Ind., will erect a plant at Sistersville, W. Va.

(For complete prices see page 264.)

Plates Sell at High Prices

Mills in the East and Central West Sell at 3 Cents, Pittsburgh—Large Tonnages for Vessels Pending

Philadelphia, Jan. 24. — Pressure for shipments and continued offerings of much new tonnage are steadily forcing the prices of eastern Pennsylvania plate makers to levels which are wholly unprecedented. One leading maker whose order book is extremely heavy, with full specifications into August, this week established a quotation of 3.00c, mill, or practically 3.10c, Philadelphia, representing a net advance of $8 to $9 per ton over the former price of 2.50c, Pittsburgh. Even this new price is made only to very preferred customers; to others no quotations are being named. Other eastern Pennsylvania plate makers ask 2.50c, Pittsburgh, as minimum and have sold at 2.75c, Pittsburgh. No new deliveries this side of July can be made by any eastern producer. The result is that a heavy tonnage of fresh business continues to be rejected. In addition to good lots for domestic buyers, this includes much effort, business ranging from 500 to 3,000 tons. A large amount of shipbuilding tonnage constantly is pressing for mill accommodation. An inquiry for 9,000 tons of car plates for first and second quarters has been circulated by an eastern buyer.

Steel Plates Now 2c

Pittsburgh, Jan. 25.—Manufacturers of structural steel plates last Thursday afternoon advanced prices to 2c for delivery at the convenience of the mill. The adoption of this figure restores the old-time differential of $2 a ton between plates and bars. Heavy demand for steel plates for the manufacture of cars and the building of ships has strengthened the situation all along the line. Eastern mills which had been offering material for rather quick delivery, now are asking as high as 2.75c for shipment within seven or eight weeks. While books have not been formally opened for shipment after July 1, some manufacturers have made arrangements to take care of the third quarter requirements of their trade at prevailing prices. The warehouse price of plates was advanced today $2 a ton to 2.60c.

Heavy Ship Plate Tonnage

Cleveland, Jan. 25.—In addition to the four Norwegian vessels awarded last week to the American Ship Building Co., four more have just been placed with the Toledo Ship Building Co. Inquiries are also pending for four large vessels for leading ore shippers and the tonnage of plates for the vessels just placed and those pending, amounts to 20,000. One Cleveland company last week sold over 4,000 tons of plates at 2.75c, Pittsburgh, and a considerable part of this tonnage was on contract for second quarter delivery. Other tonnages were sold by Cleveland mills at 2.75c and 3c, Pittsburgh. Cleveland representatives of eastern mills are finding it difficult to do much business in this territory, as those mills are quoting a minimum of 2.75c, Pittsburgh, and are unable to promise delivery in less than six months.

Plates Advance Sharply

Chicago, Jan. 25.—Steel plates were advanced $3 per ton during the last week, to a nominal quotation of 2.19c, Chicago. This carries with it shipbuilding material, which is in unusual demand for new craft for ocean traffic.

The strength of steel plates is added to by large demand by car building, some heavy tonnages being booked recently for eastern railroads.

Ferro Prices Are Soaring

Several Carload Lots Sold at $175 and Outlook for Future is Not Encouraging

New York, Jan. 25.—Spot ferromanganese has jumped $25 further and several carload sales of English have been put through at $175, seaboard. Holders of spot ferro-manganese now are talking of $185 to $190, and expect to close some business on that basis shortly. The situation has been complicated by the fact that more English producers of ferromanganese during the past few days have joined in the announcement that they cannot accept further business for delivery before the last half. Practically no additional English contracts, therefore, now can be negotiated this side of July. At least two makers also are out of the market for last half and have rejected orders for that delivery with a few days. Consumers, with very few exceptions, have contracts covering the next six months, and if they could be assured of shipments, their position would be well secured. Arrivals, however, continue to run comparatively light and are much below the obligations of the makers. One agent is making arrangements for the sailing in February of 1,000 to 1,500 tons against old contracts.

Before their principals in the week withdrew their first half offers, sellers booked some additional tonnage for second quarter and beyond at $125, seaboard. There also was some selling for last half at $125 seaboard. This volume now is reduced, although a fair-sized inquiry for last half is in circulation, including 1,000 tons for a Cleveland steelmaker.

The tightened condition of the ferromanganese market is stirring up considerable activity in spiegeleisen. Perhaps 10,000 tons of this alloy now is under negotiation, including one lot of 2,000 to 3,000 tons, and another of 1,000 tons. One domestic maker now is quoting $32.50, furnace, for 20 per cent.

High at Pittsburgh

Pittsburgh, Jan. 25.—The sale of a small tonnage of foreign ferro-manganese for prompt shipment at $175, seaboard, is reported, but details of this transaction are not known. Manufacturers of domestic material have not been offering tonnages in the open market for several weeks. Small lots of spiegeleisen are being sold at $32.50, furnace, or $2.50 above the minimum price of two weeks ago. Prices of steelmaking metals are nominal.

Plan Tin Plate Plant

A dispatch from Baltimore states that a large tin plate plant is to be erected near that city by local and New York capitalists. J. E. Alfred, chairman of the board of the Consolidated Gas Co., Baltimore, is mentioned as one of those developing the project. A capitalization of $1,500,000 common and preferred is to be issued.

Enlarging Plant

The Vanadium-Alloys Steel Co., Pittsburgh, whose works are at Latrobe, advise that they are installing an additional 30-pot crucible furnace. This company more than quadrupled its business during the past nine months, and still further enlargement will no doubt become necessary.

(For complete prices see page 264.)

Many Changes

Made in Price and Classification of Tubular Goods.

Pittsburgh, Jan. 25.—A number of important changes in the price and classification of tubular goods were made last week by manufacturers in the Greater Pittsburgh district. Steel and iron pipe was advanced irregularly from 1 to 3 points, or from approximately $2 to $6 a ton, and steel boiler tubes were advanced $4 a ton and reclassified under a list of specifications of the American Society of Mechanical Engineers. Wrought iron pipe, which has been sold at a wide range in price, will be quoted uniformly by all makers in western Pennsylvania and eastern Ohio in the future.

Manufacturers of standard steel black pipe under date of Jan. 20 advanced prices as follows: Six-inch and smaller, 1 point; 7 to 12-inch, 3 points; larger sizes, unaffected; reamed and drifted pipe, 1 point; extra strong plain ends, 6 inches and under, 1 point; extra strong plain ends, over 6 inches, unaffected; double extra strong, unaffected. Galvanized steel pipe was advanced as follows: Six inches and under, 2 points; 7 to 12-inch, 3 points; reamed and drifted, 2 points; extra strong plain ends, 6 inches and under, 1 point; extra strong plain ends, over 6 inches, unaffected; double extra strong, unaffected. Steel line pipe, 6 inches and smaller, was advanced 1 point. Line pipe, ranging from 7 to 12 inches in diameter, was put up 3 points. Oil country goods were advanced from 5 to 10 per cent.

The last previous change in prices of steel pipe was made Jan. 4, when standard and reamed and drifted pipe was put up 1 point. Since Jan. 4, spelter has advanced slightly, which accounts for the increase in the price of galvanized material. Since an additional 2½ per cent preferential discount was offered Jan. 4, advances provided by cards issued under that date did not equal 1 point. The extra 2½ per cent preferential discount has not been withdrawn.

Pittsburgh manufacturers of wrought iron pipe have announced that uniform prices would prevail in the future, and discount cards of the several makers in this district have been rearranged on a uniform basis. These cards show irregular advances ranging from 1 to 3 points.

The National Tube Co., under date of Jan. 19, issued a revised price list on lapwelded and seamless steel boiler tubes. Through the adoption of the new classification, prices of standard boiler tubes were advanced from 1 cent to 12 cents per foot. Tubes ranging from 2 inches to 5 inches in diameter were advanced from 1 to 5 cents per foot; steel boiler tubes over 5 inches in diameter were advanced from 6 to 12 cents per foot. Extra gage steel boiler tubes were advanced proportionately. As it is impossible to manufacture to an exact weight, the National company explains that the necessary variation will be represented by over weight in the future. New discounts, showing advances of $4 a ton in the price of boiler tubes are based upon the revised classification.

Makers of wrought iron boiler tubes are considering the adoption of the American Society of Mechanical Engineers' specifications and it is likely that they will issue new cards at an early date.

Demand for tubular goods is not very heavy, yet orders in the aggregate represent a gradually increasing volume of business. No large orders have been placed recently and no important inquiries are pending in the open market.

Cast Iron Pipe

Municipal Buyers are Surprised by Recent Advances.

Chicago, Jan. 25.—Cities are beginning to look out for their cast iron pipe requirements for the present season and present prices compared with those paid last year are something of a shock. Bids were opened at Saginaw, Mich., a few days ago on 300 to 800 tons, the American Car & Foundry Co. being low bidder. Figures were opened at St. Paul on 1,500 to 2,500 tons and the United States Cast Iron Pipe & Foundry Co. was low bidder. In both these cases, the contract was deferred because of the high range of quotations. In one instance, a nearby city which bought a few weeks ago paid several dollars per ton less and the rapid increase was a surprise. Bids were opened Jan. 25 at Fort Wayne, Ind., on 300 tons and will be opened Jan. 29 at Sioux City on 700 tons.

Pipe for Baltimore

New York, Jan. 25.—R. D. Wood & Co. has submitted the lowest bid on 5,810 tons of pipe for Baltimore offering the 3-inch at $35, delivered; the 4-inch at $29, delivered; the 6 to 12-inch at $26.75, delivered; and the 16 to 48-inch at $26. For the specials, from 3 to 30-inch, $59 was bid, and for 48 to 60-inch, $62. There was less than $1,500 difference in the total bid of this maker and that of the United States Cast Iron Pipe & Foundry Co., the second figure. R. D. Wood & Co. also have taken 550 tons of 6 to 16-inch for the New Rochelle Water Co., New Rochelle, N. Y. The Donaldson Iron Works has taken 230 tons of 6 to 12-inch for Revere, Mass., at $31, delivered, for the 6-inch and at $30.30, delivered, for the 8 and 12-inch. A liberal tonnage of new public work continues to appear in eastern territory and good buying by water and gas companies is being sustained. Utica, N. Y., will vote March 15 on a project requiring 2,300 tons of 6 to 10-inch. Jamestown, N. Y., is out for 1,000 tons of 36-inch, and Lynn, Mass., for 680 tons of 4 to 12-inch. A new export inquiry calling for 1,367 tons of 4 to 8-inch, for Moracaibo, Porto Rico, is in the market. Prices of pipe are steady in the east and are unchanged.

Prices Higher

Birmingham, Ala., Jan. 25.—A canvass of the large pipe situation reveals the fact that the business is holding up remarkably well for the season of the year. The west and central west have come in for a goodly share of pipe tonnage, and several important inquiries are pending. Manufacturers report sufficient business in hand to justify continuous operations far ahead. Prices have been advanced and are quoted per net ton f. o. b. cars at the plant for standard 4-inch, $27; 6-inch and up, $25, with $1 per ton extra for gas pipe and 16-foot lengths.

(For complete prices see page 264.)

Warehouse Prices

Are Again Moved Up in Cleveland and Other Cities.

Cleveland, Jan. 25.—Warehouse business continues very active and prices have been advanced as follows: Steel bars, iron bars and shapes, $2 per ton; plates, $4 per ton; No. 10 blue annealed sheets, $5 per ton.

Warehouse Prices Advance

Chicago, Jan. 25.—Warehouses in Chicago, St. Louis and St. Paul have advanced their prices on bars, plates, shapes and blue annealed sheets a uniform 10 cents per 100 pounds. This went into effect Jan. 22 and followed closely after the advance made on mill products earlier in the week.

Advanced at Buffalo

Buffalo, Jan. 25.—Warehouse prices in the Buffalo district on bars, shapes and plates have experienced another advance. The leading interest is quoting 2.60c, f. o. b. Buffalo, for bars and small shapes, with the exception of rounds and squares, 2 inches and over. The quotations on the latter have been advanced to 3.30c. Plates are being quoted at 2.90c and hoops at 3.20c.

Chicago Scrap is Weak

And Concessions Are Being Made in Other Centers —Sale of 10,000 Tons for Italy

Chicago, Jan. 25.—Unusual supply of iron and steel scrap, coupled with lack of immediate demand, brings a continued weakness in the market. This has resulted in slight recession of price on some items, while others are maintaining the former level in spite of a lack of trading. Steel mills and rolling mills are not buying and some brokers with supplies coming in are much disturbed to care for it. The embargos at steel mills have been modified and some scrap is now moving to these consumers.

Railroad offerings are fair, the Chicago, Rock Island & Pacific railroad offering a list of 5,000 tons, the Wabash railroad 960 tons, the Chicago, Burlington & Quincy railroad 2,500 tons and the Chicago, Milwaukee & St. Paul 2,400 tons, including 1,000 tons of car wheels and 500 tons of long steel rails.

Quiet at Cleveland

Cleveland, Jan. 25.—The scrap market in Cleveland is still quiet. There have been no changes in prices and consuming interests are not entering the market for material in any quantities. Dealers are confident that the next 10 days will see an upward trend set in and in some cases look for a rise in prices from 50c to $1 a gross ton. Heavy melting steel is quoted at $16.25 to $16.50 a gross ton.

Stronger Prices Expected

Buffalo, Jan. 25.—Dealers of the Buffalo district report a better than fair volume of business in the past week with an indication of stronger prices to follow. So far the strengthening has not changed the list quoted a week ago. The inquiry for heavy melting steel shows improvement and orders have materialized from the inquiry noted a week ago. Dealers are figuring on a large demand for selected steel scrap. If this deal goes through, it is stated that the commodity will experience a sharp advance in price in the Buffalo district. The demand for wrought scrap continues strong. Shipments of all classes of scrap are going forward in a satisfactory manner.

Heavy Steel for Italy

Philadelphia, Jan. 24.—A sale of 10,000 tons of crop ends and other heavy steel scrap to Italy has been concluded by a tidewater steel maker. While the price is not announced, it is understood it was around $22, tidewater. A drop of $1 to $1.50 a ton in the turnings market has been one of the week's principal developments in the eastern Pennsylvania scrap market. Embargoes declared against Lebanon, Pa., and Harrisburg, with another threatened for Pottstown, have produced this condition and this grade now is a drug on the market. Lots have been sold freely at $11, delivered. No. 1 railroad wrought has been bought liberally at $23.50, delivered, while some tonnage has gone at $24, delivered. The heavy melting steel market is unchanged. Consumers seem content to pick up odd lots at $16.50 to $16.75, delivered, but where any tonnages have been sought, $17, delivered, has been offered. Dealers still regard the price as unacceptable. An eastern Pennsylvania steel maker has sold several thousand tons of low phosphorus crops at $22.50, mill.

Quiet at Pittsburgh

Pittsburgh, Jan. 25.—The market for old materials in the Pittsburgh district continues quiet and some stock has been sold at slightly less than prices prevailing a week ago. In a number of instances, dealers have been forced to offer concessions in order to move material on track. Heavy melting steel continues to hover around $17.50, delivered, but some dealers are asking $17.20, delivered. Melters are consuming heavy tonnages, but none of the larger consumers has bought additional stock recently.

Scrap Iron Slow

Cincinnati, Jan. 25. — Numerous strikes in this territory have handicapped sales and shipments of iron and steel scrap. Several foundries have been notified to withhold shipments of castings for machine tools, and certain mills in the Youngstown district have not resumed buying following the riot by workmen a few weeks ago. Prices have not changed, but are a little weaker. Heavy melting steel is being held at from $14.25 to $14.75 per gross ton, stove plate at from $8 to $8.50 per net ton, and mixed cast at from $10.25 to $10.75 per net ton.

Heavy Shipments

St. Louis, Jan. 25.—The scrap market showed some lack of strength the latter part of last week, partly because of embargoes put out by several of the largest consumers, and partly because of heavy shipments of material by the railroads. There was very little material sold at the reduced prices, however, as consumers are not anxious for material just at this time, and dealers are holding off wherever possible, expecting the market to rebound early next month. The only railroad offering this week is a list calling for 1,500 tons issued by the Wabash.

Marked Up Prices

Birmingham, Ala., Jan. 25.—There is a continued improvement in the scrap market. Dealers have marked up their prices, and report that a very satisfactory business is coming in. There is a better demand for strictly No. 1 machinery scrap, which is used largely as low grade iron. The demand for steel scrap of all kinds is on the upgrade. This grade of scrap is coming more into favor in local markets on account of the foundrymen turning to high percentages of steel in their gray iron mixtures.

Prices per gross ton are as follows:

Old steel axles	$14.50
Old steel rail	13.00
No. 1 steel scrap	11.00
No. 1 wrought scrap	10.50
No. 1 cast scrap	11.00
Stove and light cast	9.00
Old car wheels	11.00
Tram car wheels	10.50

(*For complete prices see page* 264.)

Little Ore Buying

Cleveland, Jan. 25.—There is very little buying of iron ore at present and sellers do not expect that there will be any in the near future, except possibly by eastern furnace interests, which will be compelled sooner or later to buy lake ores in considerable tonnages, as they will not be able to depend upon supplies from foreign countries.

Nuts, Bolts and Rivets

An early advance in the price of nuts, bolts and rivets is expected by the trade, it being believed that rivets will be put up about $2 a ton and nuts and bolts from 5 to 10 per cent.

Steel Chain

Steel chain continues to be quoted at 4c for ⅜-inch proof coil. Demand is described as fairly heavy, but no large orders have been placed recently.

The Titusville Forge Co., Titusville, Pa., has awarded a contract to the Rogers Construction Co., Corry, Pa., for an addition to its plant. Extensions will double the capacity of the plant.

Otis Will Roll Sheets

At Riverside Plant, Which Will Resume April 1

—Prices High and Advancing

Cleveland, Jan. 25.—The Otis Steel Co. has made a long-time contract for sheet bars and will resume operations at its Riverside works by April 1. This plant, which rolls plates of light gage and blue annealed sheets, was first placed in operation in September, 1914, but suspended operations in February, 1915, on account of slack demand for its product. When the demand improved, it could not be operated, on account of inability to purchase sheet bars. The old plant of the company, the Lakeside Works, rolls no gage lighter than ¼-inch. The Riverside produces all gages down to and including No. 18.

Irregularities Continue

Youngstown, O., Jan. 25.—Widths and lengths continue to play an important part in the steel sheet market. Sheet manufacturers of long experience say they have never seen conditions resembling in the least the present situation. Differentials have been scattered to the four winds and price schedules are topsy-turvy. The foreign demand for materials of greater widths, together with the slump in the roofing business which takes narrower widths, prevents the market from being evenly balanced. Mills in some instances are getting relatively fancy prices for heavy gage sheets of great width and are shading current market quotations on the lesser widths. For instance, an inquiry may call for a tonnage of 16 gage 54 x 120 and a tonnage of 16 gage 28 x 120. The first-named tonnage will receive a quotation of about 2.80c, or on the basis of 2.65c for No. 10 gage blue annealed, Pittsburgh base. The second will be quoted perhaps as low as 2.25c, or on the basis of about 2.50c for No. 28 gage box annealed, Pittsburgh base.

Conditions may be said to govern almost every sale. Thus blue annealed sheet quotations range from 2.60c to 2.80c, for No. 10 gage, and black from 2.50c to 2.75c, for No. 28 gage. Galvanized sheets are a small factor in the sheet business just now, as to demand and manufacture. Steadily climbing spelter prices are advancing quotations and 5.50c about represents the market for No. 28 gage, Pittsburgh, while heavier gages are obtainable as low as 4.75c.

Sheet producers point out that a 2.50c minimum for black sheets cannot be maintained long in view of the rapidly increasing costs of manufacture.

Unfilled Orders Still Grow

Philadelphia, Jan. 24.—Mill orders in sheets still pile up with eastern makers, causing them to further raise prices. The range has been elevated to 2.75c to 3.00c, Pittsburgh, or 2.909c to 3.159c, Philadelphia for No. 10 gage blue annealed. A considerable tonnage for gas holder construction has been offered for first and second quarter shipment, but eastern mills have been unable to assume it.

Tend Upward

Pittsburgh, Jan. 25.—Manufacturers of steel sheets in western Pennsylvania have refused to be influenced by the appearance of comparatively low quotations in some sections of the country. Bessemer black sheets are commanding 2.60c and above for No. 28 gage and No. 10 blue annealed sheets are selling at 2.65c and above in the immediate district. Shipments of highly pickled material are deferred from 10 to 20 weeks. It is not unlikely that automobile manufacturers, who plan to increase the output of motor cars this year, will find it impossible to obtain necessary sheet products. Mills are being driven at approximately 100 per cent of capacity. Galvanizing departments are operating only in part, on account of the continued abnormal situation for spelter. No. 28 gage galvanized sheets are quoted at a range from 4.75c to 5.25c.

Blue Annealed Active

Cincinnati, Jan. 25.—Blue annealed sheets continue best in demand, but sales are limited to small lots, as mills will quote only for prompt delivery. Prices on this grade remain strong at 2.60c, Pittsburgh basis. Black and galvanized sheets are steady and unchanged in price. No. 28 black are quoted at 2.65c, and galvanized No. 28 at 5c, both Pittsburgh basis. Warehouse prices are as follows, f. o. b. Cincinnati: No. 10 blue annealed, 3c; No. 28 galvanized, 5.25c, and No. 28 black, 3c.

Sheets Are Strong

Chicago, Jan. 25.—A peculiar situation exists in the steel sheet market at present, No. 10 blue annealed selling at a premium over No. 28 black. The mill cost of producing black sheets is figured roughly at $10 per ton over blue annealed and the usual relation of the two products at present is due strictly to supply and demand, blue annealed being in greater demand than black at present. No. 28 gage black is now selling at 2.79c, Chicago, and higher, while No. 10 gage blue annealed is quoted at 2.94c, Chicago. No change has taken place in the situation as to galvanized sheets and No. 28 gage is now being quoted at 5.19c, Chicago, although the price is somewhat variable.

(*For complete prices see page 264.*)

Wire Products

Are Advanced to Highest Prices in Fifteen Years.

Pittsburgh, Jan. 25.—All steel wire products yesterday reached the highest quotations in 15 years, when the American Steel & Wire Co. put up prices $2 a ton; other wire manufacturers immediately put into effect a like price advance. Advances in prices had been expected ever since last Thursday, when cement-coated nail makers put up prices 15 cents, to $2 a keg.

Prices to jobbers follow: Wire nails, $2.20 a keg; plain wire, $2.05; galvanized wire, $2.75; polished staples, $2.35; galvanized staples, $3.05; painted barb wire, $2.35; galvanized barb wire, $2.05. Fencing wire was advanced 3 points to 64½ off the list. Cut nails likely will be advanced $2 a ton to $2.10 a keg. The last previous advance in price of wire products was made Dec. 21, when all makers put up prices $2 a ton.

The last time wire nails sold at a figure approximating today's price, was just prior to March 5, 1901, when nails dropped from $2.30 to $2.05 a keg. Fifteen years ago, however, prices were held arbitrarily. Since some material for prompt delivery already had been sold at prices approximating today's quotations for future delivery, manufacturers do not believe any difficulty will be experienced in establishing the advanced figures.

High Premiums

Cleveland, Jan. 25.—Tonnages of plain wire for prompt delivery are bringing some remarkable figures. One consumer has just bought 500 tons of plain wire for delivery before Feb. 1 and was glad to pay $2.65 per 100 pounds, Pittsburgh. It still would buy 2,000 tons more, but can find no sellers of such a tonnage. Wire fence makers are cutting down the amount of their regular product, some preferring to sell their plain wire in the open market at present high prices.

Awards Are Quietly Made

And Structural Steel Situation Has Appearance of Limited Activity—More Inquiries From Abroad

New York, Jan. 25.—Quiet awards continue to be a feature of the structural steel situation in this district. Builders are circulating their inquiries carefully, apparently so as to keep from the market any impressions of activity until they are covered and, even then, they are reluctant to make announcements. At least two loft buildings requiring 1,000 to 1,500 tons each, have been closed here, upon which announcement is withheld and some outside propositions also have been awarded quietly. Five or six other matters of good size are active. Export inquiries continue to come out freely and Japan asked in the week a new lot of 6,000 tons of plain material and bridge work. Specifications and new business placed with the mills continue in lighter volume, as awards since Jan. 1 have not been liberal. Plain material prices range from 1.90c to 2.25c, Pittsburgh, or 2.069c to 2.419c, New York, depending on delivery.

Car Tonnage is Wanted

Philadelphia, Jan. 24.—An inquiry for 15,000 tons of ten channels and angles, apparently for car construction, delivery to begin in two months, has been laid before eastern Pennsylvania mills through a dealer. It is thought the real buyer is inquiring in this way on the theory that he may obtain better mill accommodation. Some makers have quoted well over 2c, Pittsburgh, on the business. New specifications are still light. Japan has bought some tonnages and now is out for ten storage buildings, about 1,500 tons. Australia, South America and other export fields have closed liberal quantities. Eastern shape prices are very strong with 2.00c, Pittsburgh, or 2.159c, Philadelphia, as the minimum or standard sections. Small sales in the week at 2.10c and 2.15c, Pittsburgh, are noted.

Structural Shapes Advanced $1

Pittsburgh, Jan. 25.—Effective Jan. 20, the Carnegie Steel Co. advanced its price of structural shapes $1 a ton to 1.90c, and other manufacturers adopted a like quotation for shipment at the convenience of the mill. Consumers, in a number of instances, have been able to cover third quarter requirements at prevailing prices. Material for prompt delivery is selling at as high as 2.75c. The American Bridge Co. has taken 1,000 tons for a car float at New Orleans, but no other contracts of importance have been taken by fabricators in this district this week. The warehouse price of shapes has been advanced $2 a ton to 2.50c.

Shape Market Strong

Chicago, Jan. 25.—An advance of $1 per ton on structural shapes has been made within the past week and the nominal quotation now is 2.09c, Chicago mill. Premiums for prompt delivery on the part of mills able to furnish some of this material bring the cost to a much higher figure.

Lettings in the west during the past week, with one exception, are for small tonnages. The Public Service Co. of Northern Illinois has given the Kenwood Bridge Co. 1,179 tons for a station at Brandon, near Joliet, Ill. The largest bridge tonnage of the week was taken by the Pacific Rolling Mill Co., 250 tons, for a bascule bridge over Petaluma creek in California.

CONTRACTS AWARDED.

Public Service Co. of Northern Illinois, Brandon station near Joliet, Ill., 1,179 tons, to Kenwood Bridge Co.

California Highway Commission, bascule bridge over Petaluma creek near Black Point between Marin and Sonoma countries, Cal., 250 tons, to Pacific Rolling Mill Co.

Bridge over Hoquiam river, Aberdeen, Wash., 224 tons, to Toledo Bridge & Crane Co.

Women's Athletic Club, San Francisco, Cal., 200 tons, to Dyer Brothers.

Store building for the Winthrop Association, Springfield, Mass., 700 tons, to an independent shop.

Transmission towers on the Pacific coast, 1,500 tons, awarded to Milliken Bros., Inc., by the Blaw Steel Construction Co.

Beam bridges for the New York Central railroad, 475 tons, to L. F. Shoemaker & Co.

McIlvaine building, Philadelphia, 200 tons, to the Morris-Wheeler Co.

Another extension to the plant of the Worth Bros. Co., Coatesville, Pa., 700 tons, to an independent shop.

Car float for Morgan's Louisiana & Texas Steamship & Railroad Co., New Orleans, 1,000 tons, awarded the American Bridge Co.

Fabricated steel for Dam No. 14 in the Ohio river at Woodland, 300 tons, awarded the Indiana Bridge Co.

Professional building, Rochester, 200 tons, contract to Seneca Engineering Co., Montour Falls.

Open hearth steel works and mill extensions for the Ashland Steel Co., Ashland, Ky., 3,000 tons, placed with an independent shop.

CONTRACTS PENDING.

Scherzer lift bridge for the Norfolk & Western at Beaufort, N. C., 130 tons, bids being taken.

Garage for the Philadelphia Taximeter Co. at South Broad street, Philadelphia, 150 to 200 tons, bids being taken.

Bridge work for the Kansas City Southern, 1,500 tons, bids being taken.

Pier at Baltimore for Boyer & Co., 125 tons, bids being taken.

Public school on Bedford avenue, Brooklyn, N. Y., 400 to 500 tons, bids being taken.

Ten Eyck Hotel, Albany, N. Y., large addition, 1,200 tons, bids in this week.

Niagara Square Hotel, Buffalo, 200 tons, bids to be taken soon.

(*For complete prices see page* 264.)

Shipbuilding Demand

New York, Jan. 25.—Ship building requirements continue to present some round tonnages of plates, which the mills find great difficulty of satisfying for the deliveries wanted. For this reason, makers are reluctant to take on much more of this tonnage, especially for first half shipment. The Texas Co., which has been in the market for 12,000 tons of ship steel for second quarter, is understood to have satisfied this need with two makers.

Scrap Market Spotty

New York, Jan. 25.—A spotty condition continues to prevail in the old material market in this district. Some grades are strong, active and scarce, this applying principally to cast scrap, while other qualities are rather dull and neglected and incline toward softness. For No. 1 machinery cast, $17.50, delivered Jersey points, is offered and for stove plate $13.50, delivered. No. 1 heavy cast is at $16.50 to $17, delivered Jersey points. All the cast grades are scarce. Heavy melting steel is slow and there were sales this week at $14.40, New York, or lower than that recently talked about. Ordinary wrought is a little softer at about $20, delivered eastern Pennsylvania, but No. 1 railroad remains strong. There are some new offerings of Panama scrap in the market.

Sold at Good Prices

Birmingham, Jan. 25.—Alabama iron for last half shipment has been sold in good tonnages at $16, Birmingham, for No. 2, $15.75 for No. 3 and $15.50 for No. 4. In eastern territory one sale of 5,000 tons was put through on this basis for delivery to southern plants.

German Output

The German steel production underwent a further increase during the month of October, reaching an output of 1,214,855 metric tons for 26 workdays, compared with 1,174,350 metric tons in September with also 26 workdays.

Corporation's New Record

Marks Fourth Quarter as One of Remarkable Prosperity —All Favored Dividend on Common Stock

New York, Jan. 25.—In the fourth quarter of 1915, the United States Steel Corporation broke all records of earnings and established other high points of business transacted, which stamp it as the most remarkable three months in the history of the country's leading steel producer. The tremendous earnings of that period caused the directors to unanimously restore the former common dividend of 1¼ per cent, quarterly, which was reduced to ½ per cent at the close of the third quarter in 1914 and has been completely suspended since that time.

The total net earnings of the three months ended Dec. 31, 1915, were $51,232,788, the highest of any quarter in history. The last previous record-mark was in the second quarter of 1907, when $45,503,705 were earned. The month of December just closed, with $17,677,966, proves to have been the premier month on record in earnings, outranking October, 1907, the former record, when $17,052,210 were earned.

With the completion of the fourth quarter, the earnings of the Steel Corporation for the calendar year is shown by the addition of the quarterly reports to have been $130,351,296. There may be some slight adjustments of the total in the official annual report to be issued later. The earnings of 1915, by quarters, have been as follows:

First quarter	12,457,809
Second quarter	27,950,055
Third quarter	38,710,644
Fourth quarter	51,232,788
	130,351,296

This compares with $71,663,615 in 1914, $137,181,345 in 1913, $108,174,673 in 1912, $104,305,465 in 1911, $141,054,754 in 1910, $131,491,413 in 1909, $91,847,710 in 1908, $160,964,673 in 1907, and $156,624,272 in 1906.

Judge Gary, in announcing the results of the third quarter operations at New York, Tuesday afternoon, issued the following statement:

"The earnings for the quarter, amounting to $51,232,788, are $5,729,084 larger than any previous quarter. As usual, they were not made up until the day of the meeting of the board of directors. The amount of cash in banks is about $105,000,000. The members of the finance committee and of the board of directors were all in favor of the declaration of 1¼ per cent on the common stock."

The accompanying statement shows earnings for the fourth quarter, ended Dec. 31, 1915:

	Earnings before int. sub. bonds.	Less: Interest sub. bonds.	Balance.
Oct.	$17,335,747	$771,893	$16,563,854
Nov.	17,760,310	769,342	16,990,968
Dec.	18,440,024	762,058	17,677,966
	$53,536,081	$2,303,293	.....
Total earnings			$51,232,788
Sinking funds bonds sub., deprec., and replacements	$8,729,053		.....
Sinking funds	1,650,622		
			10,379,675
Net income			$40,853,113
Int. Steel Corp. bonds	$5,451,876		
Prem. on bonds	235,901		
			5,687,777
Balance			$35,165,336
Balance adjust. of inventories and other accounts			794,057
Total			$35,959,393
Prefd. dividend	$6,304,920		
Common, dividend	6,353,781		
			12,658,701
Surplus for the quarter			$23,300,692

The preferred dividend of 1¾ per cent is payable Feb. 23 to holders of record Jan. 31; the common dividend, March 30, to holders of record March 1.

Rail Inquiries

Are Coming More Freely from Foreign Countries—Car Orders.

New York, Jan. 25.—Foreign rail inquiries have come out more freely and there are some good tonnages pending. Russia, which has been in the market at all times for several months for additional tonnages, and has had trouble to get freight accommodations, now is believed to be getting to a point where it will be able to take action. One lot of 60,000 tons may be placed soon. France is inquiring for 20,000 tons additional, Italy wants some tonnage, and there also is the 12,000-ton lot for South Africa, previously noted.

The St. Paul railroad, which recently placed 30,000 tons of rails with the Steel Corporation, has ordered 10,000 tons more from independent companies, including 3,000 tons from the Cambria Steel Co. and some tonnage from the Lackawanna and Bethlehem companies.

Car orders of the week aggregated about 3,500. The Baltimore & Ohio placed 2,000 hoppers with the Cambria Steel Co. and the Union Tank line 1,000 tank cars with the Standard Steel Car Co. The Pressed Steel Car Co. took 100 gondolas from the Bethlehem-Chilean Iron Mines Co.; 10 ore from the Diamond Alkali Co.; 100 mine from the Wyoming Mining Co.; 50 mine from Gulf Smokeless Mine Co., and 50 mine car bodies each from the Modoc Coal Mine Co. and the Iroquois Coal Mine Co. The Wabash has ordered six passenger cars from the American Car & Foundry Co. The Chicago, Lake Shore & South Bend railway is asking 20 gondolas, five flats and five box cars. The International & Great Northern wants 11 passenger equipment.

In locomotives, the Baldwin Locomotive Works has 10 for the Union Pacific and the American Locomotive Co. two for the Quelimane Railway of Portuguese, East Africa.

Light Rails Advanced

Pittsburgh, Jan. 25.—The Carnegie Steel Co. last Saturday advanced prices of light bessemer and open hearth steel rails 15 cents per 100 pounds. The following prices of light rails now prevail: 8 to 10-pound sections, 1.85c; 12 to 14 pounds, 1.80c; 16 to 20 pounds, 1.75c; 25 to 45 pounds, 1.70c.

Standard railroad spikes are quoted at 2.25c, but smaller sizes are held at as high as 2.50c. Specifications are heavy, but no new buying is reported. Other track fastenings are unchanged in position.

Orders Cars

Dayton, O., Jan. 25.—The Big Four railroad has ordered 15 70-foot steel cars from the Barney & Smith Car Co. Work on the contract will begin at once.

May Be Combined

New York, Jan. 26. (By wire.)—Negotiations are under way for combining the plants of the Seaboard Steel Castings Co. and Robert Wetherill & Co., Inc., both of Chester, Pa. These companies may be consolidated with the Pennsylvania Marine & Ordnance Co., recently formed to merge steel companies and foundries at Chester and New Castle.

Ashland Additions

Important enlargements of steel works capacity have been ordered by the Ashland Steel Co., Ashland, Ky. This work requires about 3,000 tons of structural steel. In addition to several open hearth furnaces to be provided, one new mill will be installed.

The Modern Pattern Works, Toledo, contemplates the erection of a pattern shop, 60 x 80 feet. Plans for the erection of the plant are now being prepared.

Will Bare Facts

As to Armor Plate Costs.—Hearing of Senate Committee.

Washington, Jan. 26. (By wire.)—Acting upon the suggestion of Senator Penrose, armor plate makers who appeared today before the senate committee on naval affairs will call upon Secretary Daniels and lay before him, if he will accept it, the confidential exhibit prepared by experts for the Midvale Steel & Ordnance Co., showing cost of making armor plate. It is believed that the data contained in the exhibit will convince Secretary Daniels that the profit made on armor is fair and in such event it is thought the facts communicated to the committee will dissuade it from pushing the government bill. Armor plate makers expect to see the secretary soon, probably tomorrow. Those here today included Messrs. Dinkey, Grace, Barba and Mathews, of the Bethlehem Steel Co. The committee members said that as agents of the senate it could not accept the exhibit in confidence, but the course outlined by which Secretary Daniels may see cost figures is believed by some to indicate that the committee was impressed with the showing made by the armor plate manufacturers and that it will abandon the bill if convinced prices being paid are not unduly large. The committee will meet next Tuesday, when the armor plate makers will again be present, and may determine upon a course to be taken on the bill and more evidence may be heard. The Carnegie Steel Co. was not represented at the hearing either last Tuesday or today.

President Dinkey and Rear Admiral Joseph Straus, chief of the ordnance bureau of the navy department were witnesses today. Wide difference in figures as to cost of making armor plate and building a plant were given by the two, Straus holding that the estimate of $262 for making a ton of armor plate given by the Tillman board covers everything except administration cost at the navy department. President Grace was questioned for a short time and showed that the government's estimate does not include many important overhead items. Mr. Grace said the government could not build a 20,000-ton plant for $11,000,000 as the bill proposes and said the estimate made as to such a plant for the Bethlehem company a year or so ago placed the figure at between $14,000,000 and $15,000,00. He said the cost would be greater today. Mr. Dinkey said it would cost the government $4,000,000 a year to make armor plate and if the plant lay idle it would cost $440,000 per year at 4 per cent on the investment and depreciation on plants, buildings and other items would be $606,000 at 6 per cent or a total of $1,046,000 per year. He thought it would take three and one-half to four years to build the plant and said great difficulty would be experienced at this time in getting equipment because of rushed condition of the industry. He said $11,000,000 would build a plant of not more than 10,000 tons' capacity. Also, Mr. Dinkey said that the operating cost to the government would be more than to a private concern.

Fair Earnings

Of Brier Hill Steel Co.—Capital Stock is Increased.

Youngstown, O., Jan. 25.—Stockholders of the Brier Hill Steel Co., at their annual meeting in this city today, authorized an increase in common stock of $5,000,000, making a total authorized issue of common stock of $15,000,000. The preferred stock now outstanding is $5,000,000, making the total authorized capitalization $20,000,000. Of the increase authorized, $2,134,000 is to be issued to finance the steel plant, and the building of a by-product coke plant. The additions to the steel plant embrace the construction of three open hearth furnaces, one of which has been completed and the other two now are under way and will be ready about May 1, together with additional soaking pits. Building of jobbing mills also was authorized, but the number has not been determined.

To correct any false impressions which may have been created by recent rumors of extraordinary earnings, President W. A. Thomas has issued a statement, in which he says that exports for the year ended Dec. 31, 1915, showed 8½ per cent earned on the common stock after paying all charges, depreciation and the preferred dividends. In view of the previous surplus and the future business booked, the directors authorized the statement that dividends at the rate of 6 per cent will be paid on the common stock April 1 for the first quarter of 1916, and that dividends will be continued as long as business conditions warrant.

Directors and officers were re-elected. Officers are: President, W. A. Thomas; first vice president, John Tod; vice president, J. G. Butler Jr.; vice president and general manager, R. C. Steese; treasurer, John Stambaugh; secretary, James E. Parker. Directors include the foregoing and H. H. Stambaugh, chairman of the board, David Tod, E. L. Ford and George F. Alderdice.

Wage Advance

Of American Sheet & Tin Plate Co. Effective Feb. 1.

Pittsburgh, Jan. 25.—Effective Feb. 1, the American Sheet & Tin Plate Co. will restore base wages that prevailed before wage scales were readjusted April 15, last, according to notices recently posted in all the sheet and tin plate mills of the company. The restoration of the previously prevailing base rates means an increase of 6 per cent in wages to tin mill men and an increase of 12.6 per cent to sheet mill employes. Men employed at the Gary mill of the company, which operates under a separate scale, will be benefited proportionately by the wage schedules which go into effect a week from today.

Wage scales of the American company after Feb. 1 will be higher than those provided by the scales of the Amalgamated Association of Iron, Steel and Tin Workers. A number of sheet and tin plate mills not controlled by the Amalgamated Association have advanced wages to levels approximating those of the American company.

Tax on Munitions

Washington, Jan. 25.—Introduced in the senate yesterday by Senator Robinson, Democrat, of Arkansas, was an amendment to the internal revenue act of Oct. 22, 1914, proposing a tax on finished war munitions. It also includes the resolution recently introduced in the house by Representative Slayden, Democrat, of Texas, providing a tax on high explosives. The Slayden resolution is modified as to the amount of tax, Senator Robinson's amendment proposing a special tax of $500 per year on manufacturers of high explosives. The amendment was referred to the committee on finance.

His amendment calling for a tax on war munitions would assess manufacturers of such material 10 per cent on the contract price of their product, but no tax would be made against material made for the United States government.

Wants Catalogs

The secretary of the Swedish commission to the Panama-Pacific exposition, with offices at 863 Waller street, San Francisco, wishes to secure catalogs from American manufacturers. These catalogs will be placed in the state department of commerce at Stockholm for the benefit of Swedish importers.

Death of J. A. Hill

Heart Disease Causes Death of Prominent Publisher.

John A. Hill, president of the Hill Publishing Co., New York, died suddenly from heart disease on Monday morning, Jan. 24, while traveling in his motor car from his residence in East Orange, N. J., to his place of business. Mr. Hill had been engaged as usual in business affairs and was to all outward appearances in perfect health. Very few, even of his intimate associates, knew of the affection of the heart that resulted in his sudden death.

Mr. Hill was 57 years of age, having been born on Feb. 22, 1858, on a remote hill farm near Bennington, Vt. While a young lad his parents emigrated to central Wisconsin and he was educated in the public schools there. He early learned to shift for himself, and at 14 years of age went to work in a country printing office. After some years in the printing office, he became half owner of a machine shop. In 1878 he removed to Colorado and ran a locomotive on the Denver & Rio Grande railroad for a time. His bent toward journalism and the printing office was shown by his founding in 1885 the *Daily Press,* of Pueblo, Col., which journal he edited for some time. He contributed a number of articles to a modest sheet called *Locomotive Engineering,* which was published in New York by a company which also published the *American Machinist.* In 1888 Mr. Hill was invited to come to New York and take charge of *Locomotive Engineering.* Under his charge the journal rapidly increased in importance. Mr. Hill associated himself with Angus Sinclair and purchased the journal. Its subscription list grew rapidly. In 1896 Mr. Hill sold his interest in *Locomotive Engineering* to his partner, Mr. Sinclair, purchased the *American Machinist.*

He later acquired other well-established technical journals of high reputation. His first purchase was *Power.* Later the *Engineering and Mining Journal* passed under his control. In 1912 he purchased the *Engineering News.* A fifth journal, *Coal Age,* was established in 1911. To carry on these various publications Mr. Hill organized the Hill Publishing Co.

Mr. Hill was president of the McGraw-Hill Book Co., large publisher of technical books. An enterprise in which he took great pride and to which he devoted some of the best energy of the last years of his life was the construction on the west side of New York City of the great building to house his publications, which was completed in 1914.

The story of Mr. Hill's life is a remarkable illustration of a man winning his way by sheer strength and ability. Born in the humblest surroundings and with only such education as was afforded by the country schools in the woods of Wisconsin nearly half a century ago, he well proved the saying of the president of one of the leading American engineering colleges that "life itself is an education". From his early boyhood, in whatever occupation he was engaged, his personality was such that his associates instinctively recognized him as a leader. The impression he made on those who met him invariably was that of a man of strength and force.

Mr. Hill was by nature modest and retiring. He was a genial man, fond of companionship, and with an endless fund of good stories, but social life and club life had little attraction for him, and his two chief interests were the enterprise he had created, in which he took such pride, and his home.

Mr. Hill was essentially a man of broad human sympathies. He took a fatherly interest in the welfare of his employes and delighted to have them refer to him as "The Old Man". Some of his practical views of life were reflected in his early writings, which were published in book form, among them "Stories of the Railroads" and "Jim Skeever's Object Lessons", written largely in the vernacular of the shop and intended to teach in an attractive way certain lessons.

Mr. Hill was vice president of the Machinery Club, a member of the Engineers' Club of New York City, and Railroad Club, Campfire Club, and of the American Society of Mechanical Engineers.

Death of Wm. B. Ruggles

William B. Ruggles, head of the Ruggles-Coles Engineering Co., 50 Church street, New York, died of pneumonia on Jan. 23 at his home in Bergen Point, N. J. Mr. Ruggles was born in Bath, N. Y., 55 years ago and was graduated from Cornell university. He was the inventor of an iron ore drier extensively used on the Mesabi range. During the past year, he acted as an engineering advisor to the Russian government and in this connection he visited the great wheat-growing provinces of Russia about a year ago, designing wheat-storage and handling facilities which called for the expenditure of more than $100,000,000. Mr. Ruggles had expected to carry out these plans after the war.

Obituaries

Michael J. Drummond, head of M. J. Drummond & Co., 49 Chambers street, New York, died of pneumonia on Jan. 22, at his home, 435 Riverside drive, New York. Mr. Drummond was born in Jersey City, N. J., 66 years ago. He founded the firm of M. J. Drummond & Co. shortly after his graduation from Manhattan college, and directed its affairs until 1910, when he practically retired, turning over the business to his son, Walter J. Drummond. At that time he assumed the office of commissioner of charities under the late Mayor Gaynor, who was his life-long friend. During his occupancy of this office until January, 1914, Mr. Drummond instituted many reforms which resulted in bettering the conditions in his department. He was interested in a great many corporations and business enterprises. He was president and director of the Drummond Iron Works and occupied a similar office in the Shawmut Clay Mfg. Co. He was director in the Glamorgan Pipe & Foundry Co. and was an officer in several banks in New York.

John Fulton, who, prior to the Johnstown flood was general manager of the Cambria Iron Co. and had been prominent in the early days of that company, died at his home at Johnstown, Pa., on Jan. 21, aged about 85 years. Mr. Fulton retired from the company when the work of reconstruction was inaugurated following the flood and devoted his time to the work of a mining and metallurgical engineer. He was largely identified with the Hope Coal & Coke Co. and other interests.

James D. Farasey, proprietor of the H. E. Teachout Boiler Works, Cleveland, died at Charity hospital in that city, Jan. 25, following a surgical operation. Mr. Farasey was 58 years of age and for 22 years had been proprietor of the Teachout works. For over 20 years he had been secretary of the American Boiler Manufacturers' Association and was well known to boiler manufacturers throughout the country. He was personally very popular and his services to the association were of a very high order.

William Guiler, head of the Wm. Guiler Co., New York City, who built the first railroad in Porto Rico and the wireless towers at San Domingo for the government, died at his home in New York City, Jan. 20, aged 46 years.

John George, president of the Acme Foundry Co., Brooklyn, died at his home in that city on Jan. 20, aged 60 years.

Tin Plate Higher

Leading Makers Advance 25 Cents—Cut Nails Marked Up.

Pittsburgh, Jan. 26. (By wire.) — Some mills are selling steel plates for forward shipment at 2.35c, or $7 a ton above the price offered by mills for delivery at their convenience. One plate manufacturer in this district has sold a fairly heavy tonnage for second quarter delivery at a spread of 2.35c to 2.50c. As high as 2.75c and even 3c is being paid for shipment within three of four weeks.

Several manufacturers of tin plate are asking $4 base, or $5 a ton above the figure adopted at the opening of the buying season. The market is quotable at a spread of $3.75 to $4, base.

Cut nails have been advanced $2 a ton, to $2.10 a keg.

Shrapnel Steel for France

New York, Jan. 25.—Some large new matters in shrapnel steel which are distinct from tonnages which have been dragging along, have come up during the past few days in this territory, and there may be early action as some producers are more disposed to book business. It is understood that France now is consuming shell steel at the rate of at least 2,000 tons a day, and that while it has liberal stocks, that it must necessarily place some large tonnages soon in this country. One lot of 40,000 tons of 6 and 8-inch billets for shipment beginning June was placed before sellers here this week for a shellmaker. J. P. Morgan & Co. recently inquired for 250 tons daily of 1 7/16, 1 3/16 and 1 1/16-inch rounds from July to January or approximately 45,000 tons; but this now has been withdrawn. This steel was intended for scabbords. Not much new business is moving in the market for soft steel bars. Most of the mills are not quoting.

Now Has Four Boats

The Buffalo Steamship Co., which for several years has carried ore to the Susquehanna furnaces of Rogers-Brown Iron Co., and which in ownership is closely allied thereto, recently has contracted with the Great Lakes Engineering Works for a 12,000-ton ship, 600 feet long, 60-foot beam with 30-foot molded depth.

This gives the Steamship company a fleet of four modern boats, all of which are under contract to the Rogers-Brown Iron Co.

The old blooming mill of the Pottstown Iron Co., Pottstown, Pa., which has been idle since 1893, is being dismantled and some of the equipment is being shipped to Coatesville, Pa., where it will be used in the extensions of the Worth Bros. plant of the Midvale Steel & Ordnance Co.

Personals

Maynard D. Church has been appointed chief engineer of the Terry Steam Turbine Co., Hartford, Conn.

H. E. Lewis, assistant auditor of the Bethlehem Steel Co., has been appointed assistant to President E. G. Grace, of the company, succeeding the late A. D. Mixsell. Mr. Lewis has been prominent in the development of athletic and recreative work at the Bethlehem plant.

Wm. H. Donner, president of the Cambria Steel Co., has been elected president of the Frontier Steamship and the Niagara Transit companies, which recently were acquired from the M. A. Hanna interests of Cleveland to carry ore for the Cambria Steel Co.

Andrew Nicklas, recently connected with the sales department of the Pittsburgh Crucible Steel Co. and formerly with the Republic Iron & Steel Co. at Pittsburgh, in a similar capacity, has become associated with the Philadelphia office of Hickman, Williams & Co., Inc., Pennsylvania building.

W. E. DeWalt, connected with the vanadium department of the Homestead steel works of the Carnegie Steel Co., at Munhall, Pa., has resigned to accept the superintendency of the new plant of Peter A. Frassee, at Hartford, Conn. Mr. DeWalt was connected with the Carnegie company for 21 years.

Frank A. Scott, formerly secretary and treasurer of the Warner & Swasey Co., Cleveland, has been elevated to the vice presidency and continues as treasurer. He has been succeeded as secretary by Leslie B. Stauffer, who has been associated with the company for about 17 years. Louis Ringe Jr., of St. Charles, Mo., was elected president of the Mississippi Valley Retail Implement Dealers' Association at the closing meeting of the association at the Planters' Hotel, St. Louis, last Friday. Other officers chosen were: Hemp Williams, of Hot Springs, Ark., vice president; W. C. Mangold, Anna, Ill., secretary-treasurer.

The Fred Medart Mfg. Co., St. Louis, has determined to erect a plant at Second and Potomac streets in that city for the construction of steel ladders. The plant will be of concrete and will cost $40,000. President E. J. Medart said 100 men would be employed.

Metal Markets

General Movement is Toward Higher Price Levels.

New York, Jan. 25.—Prices in the metal markets generally moved toward higher levels during the week. This tendency was manifested especially in copper which metal now is so well sold ahead that first hands are quoting only future deliveries. Electrolytic for April and May delivery is held at 25.25c to 25.50c, delivered 30 days; on lake copper for April to June shipment producers' prices nominally are as follows: Best brands 25.50c, cash, ordinary brands 25.25c to 25.37½c, cash, arsenical lake 25.25c, cash. The leading selling agencies no longer are offering spot delivery at regular quotations. Their spot and nearby metal is so limited that they are holding it to supply to their regular customers at premiums; such sales of spot are reported at around 26c. Ordinary casting copper is quoted nominally at 24.25c to 24.50c, cash.

The spelter market has been featured by a good business and producers report they now are so well sold ahead that they have very little metal left for first quarter shipment. Minimum quotations on prime western are as follows: Spot, 19c, St. Louis; January, 18.75c; February, 18.25c; March, 17.75c to 18c; second quarter, 15.75c to 16c. Brass special is quoted at 21c, St. Louis, for prompt shipment.

The price of lead was advanced again by the American Smelting & Refining Co. last Friday to 6.10c, New York, and 6.02½c, St. Louis. Independent producers are asking the same at New York, and 6c to 6.05c, at St. Louis; these interests are well sold ahead. The feature of the market has been the booking of some large tonnages for export. There are some second hand offerings at around 6c, St. Louis, but these do not embrace much tonnage. A good many of the independent producers now are quoting only with St. Louis as a basis, since the railroad embargoes make it impossible to guarantee delivery in the east.

Demand for antimony is quiet but steady, and the supply of the metal is small, with the result that prices are mounting steadily. Chinese and Japanese for spot shipment are held today at 43c to 44c, in lots of one and two tons. Domestic antimony is quoted at 42.50c to 43c for spot shipment. February arrivals of Chinese and Japanese are held at around 35.50c, in bond, equivalent to 38.50 to 39c, duty paid. There are some big foreign inquiries in the market.

The aluminum market is exceedingly quiet and carloads of No. 1 ingot may be had at 53c to 55c, for prompt shipment. There has been some business in the outside market at around 57c for export. The domestic producer's contract price now ranges from 33c to 35c.

Considerable business has featured the tin market, but there is less activity today on account of a partial decline in London. The supply of spot is scarce; at the same time there is not much demand for spot. Quotations are: Spot and January, 42c; early February, 42.75c; second half of February, 41.50c; March, 41c; April 40.75c; May, 40.50c.

Serves Double Purpose.—The Domhoff & Joyce Co., dealer in pig iron, coke and coal, Cincinnati, is sending out an exceedingly neat and unique combination of a calendar and clip for desk use. While the clip holds papers tightly, the monthly calendar is constantly before the eye.

Powdered Coal in Forge Furnaces

CONTINUED EFFORT on the part of experimenters engaged in the development of powdered coal as an industrial fuel, has evolved several types of feeding devices. In this article Mr. Mann describes a method of mixing the coal dust and air and of supplying it to the burners, which was developed at the Schenectady laboratories of the General Electric Co. This method is based upon a simple screw principle.

By Arthur S. Mann

POWDERED coal has long been used as an industrial fuel. It is more difficult to burn it beneath a boiler, however, than in a forge furnace or a cement kiln. It seems simple enough to drop coal down a pipe by a screw feed, and to pick it up with a cross current of air which carries it along to a furnace; as a matter of fact, it is simple provided the rules are obeyed. But such a plan is not economical; the mixture is poor and some of the coal is slow in burning; the fire may do the work required of it if it has enough room, but it will not give a high initial temperature. Coal acts like other dust. Some of it is picked up on an eight-mile breeze, but it will not stay in suspension at that speed; double the velocity to 1,500 feet per minute and most of it will stay up, though 2,000 feet is none too high a speed for general work.

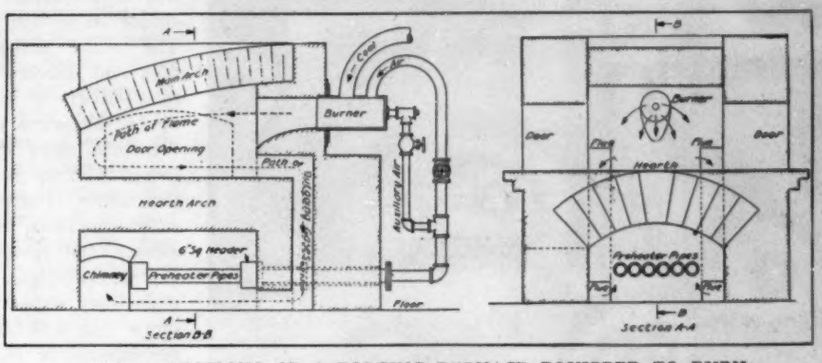


FIG. 1—SECTIONS OF A FORGING FURNACE EQUIPPED TO BURN POWDERED COAL

It is not good practice to send such a current into a furnace at such a speed. The combustion of carbon compounds proceeds most satisfactorily at a high temperature. A perfect mixture also is necessary. A particle of coal speeding along parallel with an air stream has no inducement to mix with 10,000 air volume units, which it must have for its combustion. Such stream lines should be broken up.

There are many ways of stirring things up. In one case we let the stream make a sharp turn with fair results; but more than one turn is needed and such turns require space in the furnace. One general rule may be stated; it is easier to make the mixture, which must be done in one-third second or less, if all the ten thousand volumes of air required are not put in at once. Two, three, even five subdivisions are much better, if the quantities are great.

A device which is being used to produce a satisfactory mixture and at the same time to reduce high velocities is shown in Fig. 2. It consists of a cast iron cylindrical box eight inches in diameter, with five openings beside its discharge mouth. Either opening *S* or *T* is used for coal and the primary air which carries from 40 to 60 cubic feet of dust per pound. Either *X* or *Y* is used for the combustion air and sometimes air is admitted at the end *U*. The first four of these openings, which are tangential, causing the currents to take irregular spiral forms, are used for short burning.

For an ordinary forge furnace, say 4 x 5 feet, *S*, *Y* and *U* will be piped up. A fire is started by admitting combustion air through *Y* alone, and in this way a complete mixture can be dropped on burning kindling. If a complete and uniform heat is wanted,

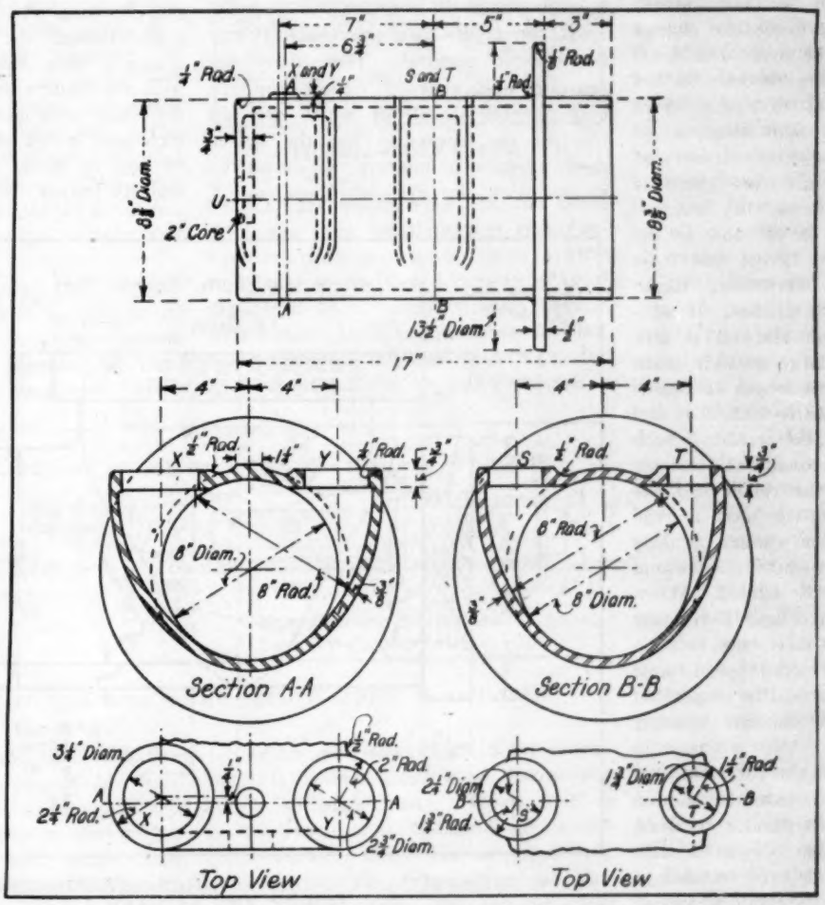


FIG. 2—ELEVATION AND SECTIONS OF AN 8-INCH POWDERED COAL BURNER

The data presented in this article is the result of experimental work performed by the author at the Schenectady, N. Y., plant of the General Electric Co., and described in the *General Electric Review*.

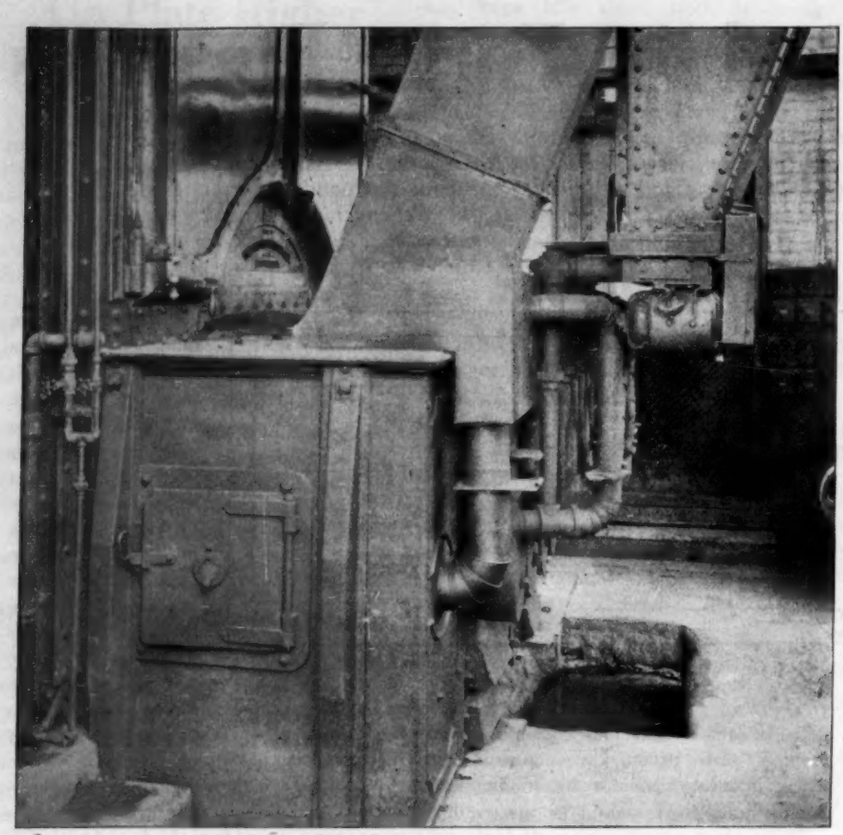


FIG. 3—MUNOZ BOILER FIRED WITH POWDERED COAL, SHOWING AIR SUPPLY TO COAL BURNERS AND COAL HOPPER WITH FEED MOTOR

additional combustion air is admitted at *U* and there is an immediate change in the character of the fire. The flame is no longer local; the mixture is not so good and burning calls for more time. Coal that can find adequate air near the tuyere burns there; other coal waits until it finds air, and there is consequently a long flame. By manipulating the air valves at *Y* and *U* the range of regulation is great and it is possible to make a very long flame. The same is true of an oil fire. If mixtures are lean enough and oil is sent from the burner in large enough quantities, a flame of great length is attainable; it is only requisite that the fuel and air travel in parallel streams. Such long flames are not economical. It must be remembered that the velocity of the stream passing along the axis of the burner must not be low enough to drop the coal, so a burner must not be too large if a short fire is wanted. When two air streams as at *S* and *Y* rotating in counter directions meet, the rotation becomes nil and the axial speed must be enough to keep the coal in suspension and to preserve the mixture already made.

It will be noted that the rotary motion within this burner is just the motion used in a centrifugal separator to draw moisture out of steam, or in a dust collector to separate air from solids. In these devices either the body diameter is large enough to keep the two elements apart, or baffles are provided to trap the heavier material. Then there are separate and guarded outlets for the two components, all of which are not true of the burner. That the device does produce a mixture is shown by its operation; for even when openings *S* and *X* are used, causing both sets of air to swirl in the same direction, the flame is only about 24 inches long, and as the combustion air at *X* is reduced and the air at *U* increased, the flame length is increased and combustion becomes slower, showing a less perfect mixture.

While there are several designs of feeders in use and no doubt many more will be invented, we have found that a simple screw will answer every purpose. The feeder draws coal from a supply tank and delivers it in definite amounts to a cavity in which it can be picked up by the primary or carrying air; and therefore more than one speed is required. In the plant under consideration the feeder is driven by a little motor which can turn at 1800 revolutions per minute, 600 revolutions per minute, or any intermediate speed, and is geared down only once. We therefore made a screw that will feed at 300 or 600 turns per minute, or more if required. With so wide a speed control it is possible to carry a fire that shows just a visible red; by a simple movement of a rheostat handle this same fire will spring up vigorously and shortly give a high enough heat for any forge work.

A feature of the plain screw feed that makes it very convenient in many situations is its ability to stand a little back pressure, so that discharge distances may be long. In the installation under consideration, the coal is being fed across a shop, that is, the supply tank with its feeders and motors is fixed to the shop wall, out of the way. A 2-inch pipe is led along underground for 90 feet or more, then up to a furnace and its burner. The distance could be

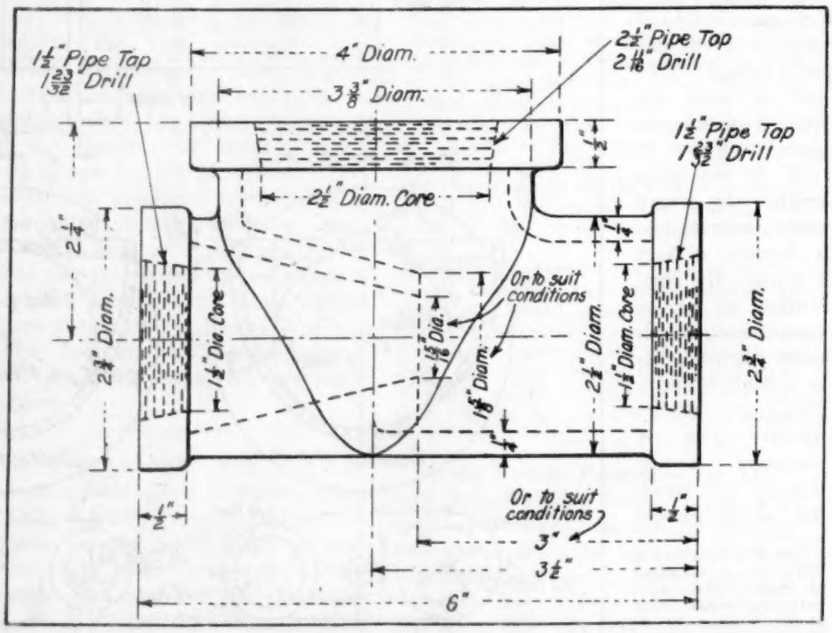


FIG. 4—THE SPECIAL PIPE TEE IN WHICH THE POWDERED COAL IS PICKED UP BY THE PRIMARY AIR

much greater, even a few hundred feet, and the control would be just as convenient and exact because the switch and rheostat are located at the side of the furnace, and the operator has no occasion to come over to the supply tank. In all these long transmissions there is a little back pressure at the screw. Primary air is introduced on the eductive principle, using the fitting shown in Fig. 4. The resistance on the discharge side increase with distance. If the distance is short, we have a negative pressure in the pipe leading from the end of the screw to the opening *A*, shown in Fig. 4. Eight inches of vacuum, by water column, is easily attainable. As the discharge distance increases with the addition of elbows and angles, the vacuum falls, and we may have even five inches pressure. A plain screw is little affected by these changes, for the throat fit at *A*, Fig. 5, is machined and gives a certain force to the coal. We have, however, so proportioned our long transmission that static pressure is usually negative.

The screw and its feeder box are shown in Figs. 6 and 5, respectively. While usually only a small amount of power is needed to turn the screw, there are times when considerable power is required. Normally the coal is light and fluffy, but under certain conditions, coal can pack so tightly that no mechanical device can move within it. The screw is cut in a lathe with spaces proportioned to the quantity required. A 2½-inch diameter screw, as shown, will feed 700 pounds per hour, and much more with slight modifications. The bottom of the thread is tapered so that after the screw has taken its bite, the volume increases as the thread advances, and the flow to the pipe is free and easy in consequence.

The weight of a cubic foot of coal may be anything from 20 pounds to 50 pounds. As coal lies on a feeder screw it will not reach 20 pounds per foot. When delivered by a conveyor screw to a tank 7 feet deep and measured immediately it weighs 31½ pounds per foot. In 24 hours it will reach 35 pounds, and increases in density till in six weeks, without jarring, it will weigh 38½ pounds. Now these changes will take place in a container with smooth sides, or in one with a diameter equal to half its depth. In a piece of 6-inch vertical pipe 10 feet 6 inches long, it was found that there was little settlement in two months. The pressure in the tanks, however, is computed at 35 pounds. It is not difficult to dry the coal to 0.5 per cent moisture or less, but there is always some small portion that contains moisture in execess. It is a little surprising to find an 8-ton bin of coal that has been nicely dried dripping with water 12 hours afterwards; but this sometimes happens, and it is not an uncommon thing to find a pulverizer frozen up with this water in the morning. It is not difficult to locate the source of such water. When coal is in a dryer, it is hot and so is its contained air. The air is saturated with moisture at the temperature of the dryer, and when the coal and air cool, the moisture is precipitated and in cold weather makes its presence felt. It thus appears that coal canot be made thoroughly dry through the agency of heat.

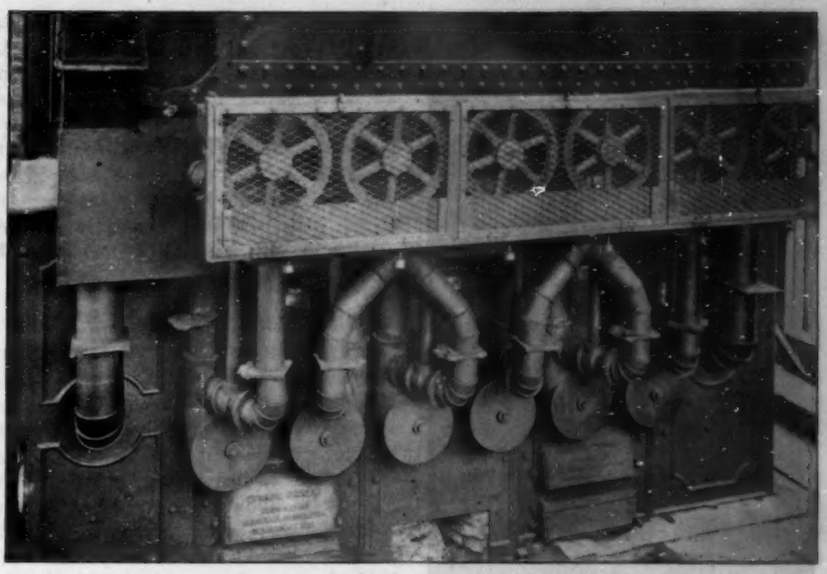


FIG. 7—FRONT OF BOILER, ILLUSTRATED IN FIG 3, SHOWING COAL AND AIR CONNECTIONS TO BURNERS AND METHOD OF GUARDING MOTOR GEARS

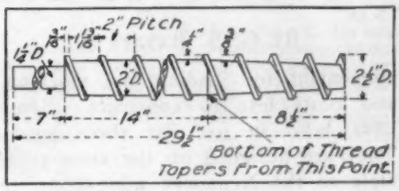


FIG. 6—FEEDER SCREW

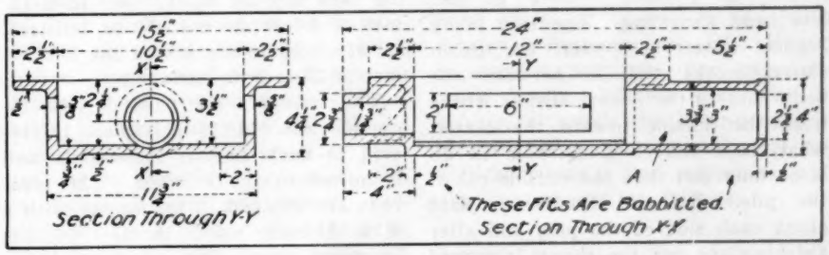


FIG. 5—FEEDER BOX IN WHICH THE FEEDER SCREW IS SITUATED

A question often asked is: Can I use my present oil furnace for a powdered coal furnace? The answer is generally in the affirmative, though the writer believes it will pay to rebuild a furnace when its fuel is changed. As a rule two oil burners, if they be of the atomizing type, are required on an average furnace. An oil burner of the globular type needs a combustion chamber of some sort. A coal furnace needs but one burner and calls for no combustion chamber. In every other respect the coal furnace is more complex than its oil counterpart. An oil fire makes no visible smoke and there is little or no odor from its products of combustion, so there is no reason why there should be a chimney or in many cases even a furnace vent. Flame and hot gases can be brought up to and passed out of the door, keeping the fronts hot. A coal fire yields no black or colored smoke, though the gases contain some small particles of white ash, but it does have a decided and disagreeable odor.

It is better therefore to provide a hood over the furnace door, if heat is wanted at the door, as it is in most forge work. This hood must have an outdoor vent. If all gases are allowed to escape in this way, the heat distribution is not perfect and therefore a chimney vent should be provided at an appropriate point. It is good practice to run this chimney up through the roof over each furnace and to cut into it a 45 degree Y, to which the hood vent is attached and in which an upward draft is induced by the chimney draft. Figs. 8 and 9 show such connections. It

FIG. 8—FRONT VIEW OF A FORGING FURNACE WHICH USES POWDERED COAL FOR FUEL

pays to provide a nicely fitted damper which can be adjusted with precision; if the damper works on a screw thread the tips can be moved 1/50-inch, though such a fine adjustment is not needed. It also pays to preheat the combustion air. The saving in fuel greatly exceeds the fuel represented by the heat imparted to this air. It was found that a saving of 35 per cent was secured in one case with air heated to 334 degrees Cent., while the heat contained in the combustion air was only 16 per cent of that in the coal.

Use Moderate Air Temperature

In this work, only a moderate air temperature was used, as it is preferable to install only such heating surface as can be readily cleaned, and the low temperature prevents burning out the preheating surface. It is good practice to allow 15 feet of surface in a furnace that burns 100 pounds of coal per hour, with an inside temperature of 1355 degrees Cent. The preheater is made of 3-inch cast iron soil pipe, six lengths being rusted into a header at either end and placed beneath the hearth in the path of the waste gases. Two vertical sections of a furnace in the Schenectady works of the General Electric Co. are illustrated in Fig. 1.

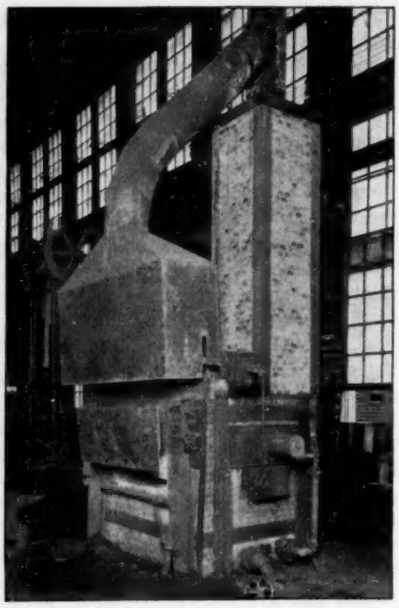


FIG. 9—FORGING FURNACE USING POWDERED COAL

The hearth is 43 inches long and 24 inches deep though this same design is used for furnaces twice the area.

A Stockpile Trestle of Recent Design

By G. S. Barber

THE ORE stocking trestle, in use at the Colby and Ironton mines, is different from those in general use, as it has bents of one leg instead of two. This design removes some of the inconveniences of the common two-leg trestle. With the common trestle, the beginning of steam shovel loading means to tear down the stockpile trestle. The wiring for lights and motor, the rails and planking, stringers and caps are taken off and lowered to stockpile floor and hauled out of the way to be stored until the stockpiles are cleaned up, when they are again hauled back and the trestle is rebuilt with a loss of material and labor of two-thirds the cost of the original trestle. The trestle legs are pulled out of the pile when the shovel reaches them, or, frequently, are broken by a slide of ore, or with the shovel dipper, and are cut up for underground mining timber.

To avoid this loss and inconvenience the new trestle has bents of one leg only, spaced on 32-foot centers and guyed on each side. The stockpile is loaded without taking down the trestle.

This trestle is more permanent, more convenient for loading and stocking, and costs less to construct. Some have been in use for three years. They are designed on the same principle as the Negaunee mine concrete pier trestle, but are built of timber throughout, and while not absolutely permanent, they do not have to be taken down every time the stockpile is loaded. They are much cheaper than concrete.

In loading, the legs do not hold back the ore as do the two-leg bents; slides are fewer, and pulling out of the legs, necessary on a two-leg trestle, is avoided. There is also less hand shoveling. The legs being 32 feet center to center, the steam shovel works well in between the bents and as the shovel always works from the outside toward the center, what hand shoveling there is to do is on finer dirt than the outside rill of the pile. Railroad tracks are laid along each side of the pile, and after finishing one cut, the shovel is moved back on the loading track and started in on the other side of the pile. This arrangement allows the first track to be moved in while the second cut is being made. With trestles 38 feet high, three cuts cleans up the pile.

The cost of construction is slightly in favor of the one-leg trestle. The difference has been found to be about 25 cents per foot. As the trestle is not taken down to load, it is always ready to stock even during the shipping season. Where stockpile room permits two or more of these trestles, side by side, only one set of guys are needed on the outside, the trestles being guyed to each other on the inside.

Each bent is a single leg of 12 x 12-inch fir, 38 feet long, on which a 12 x 12-inch fir cap, 7 feet long is mounted. This cap is braced by two 6 x 8-inch x 6-foot fir braces, mortised and bolted to both leg and cap. To each cap are bolted two 12 x 12-inch x 4-foot fir corbels or bolsters, to which again are bolted the 8 x 16-inch x 32-foot fir stringers.

The stringers are trussed with 16-pound rails. A 5/8-inch plate is riveted to each end of these rails and is bolted to the stringer. The truss rods are blocked in the center with a 6 x 12-inch wood piece. To the stringers are spiked 3-inch planks. 5 feet long, and the 30-pound rails are laid on the planks at 30-inch gage. Outside of the 30-pound rail, a 16-pound guard rail is spiked. A plate is bolted to each end of the cap. An eye in the end of the plate permits the guys to be attached. These guys are 3/8-inch galvanized

(*Continued on page* 264c)

Presented at the recent meeting of the Lake Superior Mining Institute. The author, G. S. Barber, is superintendent, Colby Iron Mining Co.

Use of Wrought Manganese Bronze

INTRODUCED into the United States in the early nineties, the low melting point and adaptability for intricate casting of manganese bronze rapidly popularized this metal. In the form of forgings, it has found wide application in irrigation and mining machinery and in marine fittings which must resist the corrosive action of sea water, as well as in many other fields. Mr. Jones describes the manufacture of the alloy.

By Jesse L. Jones

MANGANESE bronze, when introduced into the United States from England about 1893, found its first important application in the manufacture of propeller blades because of its strength and toughness and its resistance to corrosion when exposed to sea water. The low melting point of manganese bronze and the ease with which it can be cast into the most intricate forms led to its adoption for many automobile parts and numerous other applications where service conditions are extremely severe.

The rolling and forging grades of manganese bronze had at first only a very limited field. The greater cheapness of the cast manganese bronze, its remarkable uniformity and excellence and the fact that there was so little difference between it and the hot rolled grades as to physical characteristics, discouraged the use of wrought manganese bronze in many quarters.

As a rule, however, designing engineers consider forgings more reliable than castings, it having been ascertained that wrought manganese bronze usually possesses greater strength and ductility than yellow brass, Muntz metal, Tobin bronze, etc. Hence forged manganese bronze began to be used in various water supply and irrigation projects. Forgings over 3¾ inches in diameter, more than 20 feet long and weighing over 900 pounds have been successfully made. There is no record that any of these forgings have proved unsatisfactory or have failed in service. Other applications of manganese bronze include piston rods, shafting, axles and machinery to be used in mines where corrosive water is present, or on shipboard for turret parts in connection with gun mounts, ordnance attachments, etc., where the metal must resist corrosion by sea water. A very soft, tough grade is used for sheet metal, which has found application in the hulls of racing yachts, staybolts for locomotives and other bolts which must resist shock or the effect of repeated stresses. Extruded manganese bronze blades have found some application in steam turbine construction, where the erosive action of high pressure steam is very severe. A large amount of wrought manganese bronze is also used by powder and explosive manufacturers in situations where strength and non-corrosiveness is demanded, or where the use of steel would be dangerous, owing to its giving off sparks when struck.

Wrought manganese bronze differs chiefly from the casting grade in being free from aluminum. The addition of aluminum enables the alloy to be cast satisfactorily in sand molds. The following specifications as to composition may be considered as representative of the manganese bronze alloys most generally used:

	Grade		
Constituent	No. 1 A for bars.	No. 1 B for sheets.	No. 2 for sand castings.
Aluminum	nil	nil	.15
Copper	57.35	58.15	56.00
Iron	1.40	0.75	1.40
Lead	0.03	0.03	0.03
Manganese	0.02	0.02	0.12
Tin	1.20	0.45	1.05
Zinc	40.00	40.60	41.25

In order to secure ductility as well as high tensile strength, extreme purity of the materials used is absolutely essential. The grade of copper used in England is known as "best selected". It is of good quality, except that it contains antimony and arsenic which harden and lower the ductility of any alloy in which the copper is used. In the United States, opinion as to which is the best grade of copper, is somewhat divided. Non-arsenical lake copper is usually preferred for particular work because of its uniformity in quality, although the best grades of electrolytic copper are of equal analytical purity. The impurities usually present are as follows:

	English	Lake
Antimony	0.019	nil
Arsenic	0.023	nil
Copper	99.895	99.881
Copper suboxide	trace	0.112
Iron	0.056	0.004
Lead	nil	trace
Silver	0.007	0.003
Sulphur	nil	trace

In the manufacture of manganese bronze the selection of a pure grade of zinc is perhaps more important than any other one consideration. Freedom from lead is essential, this metal oxidizing readily and making a drossy, brittle alloy. Absolutely pure zinc would be an ideal material, but, although it can be and has been produced commercially, its high cost has militated against its use. Dr. J. W. Richards made several tons of electrolytic zinc a few years ago in Philadelphia. A very pure zinc is produced in Eastern Pennsylvania from a willemite, or silicate of zinc ore.

The concentrate contains garnet, rhodocrosite, red oxide of zinc and franklinite. The ore will average 49.26 per cent zinc and 3.50 per cent manganese. The slab zinc, which is marketed under various names, produces a manganese bronze of remarkable strength and ductility.

A zinc of almost equal purity is produced by the double distillation of galvanizer's dross, the slabs being skimmed just before setting so as to remove any impurities that rise to the surface. While there is little difference in the analysis of zinc made from willemite and that made from dross, the former has the greater toughness and strength. Perhaps this is due to the manganese in the ore. At any rate, if samples of the two grades of zinc of almost identical analysis are cast into slush molds, the one casting is liable to crack and the other will not. For this reason, makers of intricate slush zinc castings are compelled to use the willemite zinc. A number of the makers of high grade zinc use the slush mold as a means of testing their product, and it will be found a very satisfactory way of testing zinc to be used for making manganese bronze. The ordinary grades of spelter known as "prime western" contain much lead and for this reason should never be used. Scrap zinc reclaimed from sheet, etc., is also poor material. It may be high in lead and tin because of having been soldered, or may contain much cadmium, which element has a hardening effect on manganese bronze. The grade of spelter used in England in conjunction with "best selected" copper is a French spelter known as Font-d'Art. The accompanying table indicates the composition of various zincs. Crucibles are generally used for

A paper read at the annual meeting of the American Institute of Metals, Atlantic City, N. J., Sept. 28 to Oct. 1, 1915.

making forging manganese bronze the heats being 325 pounds each and requiring a No. 125 crucible. More recently there has been a tendency to use a No. 300 crucible, as the smaller crucibles limit the output. Another reason for using the larger crucibles is that when a number of furnaces are attached to the same stack, there are variations in the draft and it is seldom that any two crucibles can be brought out at the same temperature. The copper is first melted, then superheated, keeping it carefully covered with charcoal. Next the iron and manganese are added from a small crucible in which they have been separately melted. Finally the zinc is added, a little at a time, with constant stirring, and the alloy poured into ingots, for melting. The remelting is considered necessary to secure a more uniform distribution of the iron and manganese. If the initial temperature of the copper is not high enough, or if the zinc is added too rapidly, the iron addition is thrown out of solution to a greater or less extent and is found disseminated through the ingots in the form of small shot which are practically high carbon tool steel. These shot will knock the edge from a machining tool in a few minutes and will cause cracks in a forging when it is stressed. This composition is as follows:

Aluminum	nil
Carbon, combined	4.34
Carbon, graphite	0.66
Copper	3.82
Iron	89.44
Manganese	trace
Phosphorus	0.010
Silicon	trace
Sulphur	0.020
Tin	0.110
Zinc	0.870

It is not difficult to obtain a uniform alloy, however, if due regard is had to the temperature of the copper. The copper must not only be hot, but very hot, as it is much easier to make bad metal by underheating than by overheating. Where the ingot metal is remelted for pouring into slabs or billets, reverberatory furnaces can be used if intelligently handled. A satisfactory method of melting manganese bronze is in the open flame, oil fired type of furnace. The melting loss is low, the additions can be thoroughly alloyed and the metal poled and worked so that remelting is entirely unnecessary and the metal can be poured into billets at once without the usual double melting loss. Large heats up to 20,000 pounds can be made and the resulting economy is considerable. Dross may be removed from manganese bronze which is poured into slabs, by skimming the slabs just before the metal solidifies.

In making large ingots, a crucible with a hole in its bottom, may be set on the ingot mold. By keeping the crucible partly filled with molten metal, the entrance of dross is prevented. When the metal is poured, there should be as little drop as possible, for a long drop results in the formation of considerable dross. Hence, ingots should be short and thick, if possible. Bottom pouring would be advisable, except that it would produce cold metal at the top of the ingot and result in the formation of long pipes. With care a discard of only 2 per cent from the top of the ingots is possible. As the surface of the ingots is liable to be rough and full of cold-shuts, the ingots must be overhauled or rough turned before forging or rolling, in order to avoid blister or slivers in the finished product. The pouring temperature of the bronze must not be too high, or it will cut the molds and become contaminated with cast iron.

In the course of time, the ingot molds become coated with a layer of metallic zinc mixed with zinc oxide which has sublimed from the red hot ingots and has condensed on the face of the molds. Unless this deposit is removed by scraping the molds or by heating them to a red heat in an annealing furnace, the quality of the ingot metal soon deteriorates. The zinc seems to diffuse through the ingot in a remarkable manner, possibly being deposited along the margins of the crystal grains in the form of metallic zinc, making the bronze less ductile. At times, too, this layer of zinc on the mold will produce such a volume of zinc vapor when the bronze is poured that the ingot is full of blow holes.

Manganese bronze can be readily forged, drop-forged, rolled or extruded at a red heat, the physical characteristics of the alloy depending on the finishing temperature employed. The material hardens rapidly when worked cold, and machinery designed for the cold rolling and drawing of Tobin bronze, Muntz metal and yellow brass is not usually powerful enough to handle manganese bronze properly. This may result of the exterior of an article being overstrained, while the interior remains soft and comparatively unwrought. Excessive cold work on manganese bronze makes it glass hard and it may even become full of hair cracks and incipient fissures invisible to the eye, but capable of being shown by stressing. An infallible test for excessive cold work on material otherwise of good quality is the appearance of the fracture of a test piece. If cup-shaped or lipped like the fracture of a soft steel specimen, assurance may be had that the manganese bronze has been given the proper heat and forging treatment. If, however, the fracture is conchoidal and irregular, excessive cold work without proper annealing is indicated.

As the number of firms making manganese bronze has increased, competition has grown keener, and the quality of the metals used in the bronze has not invariably been as high as it should be. This has resulted in lessened ductility. Another cause for this fault is the desire for a higher tensile strength on the part of some designing engineers. To meet this demand, manufacturers have resorted to various plans which gave bronze of a higher tensile strength and elastic limit, but always with less ductility. One manufacturer uses the casting grade of bronze, melts in an open flame furnace and poles the metal until a part of the zinc is removed together with much of the dross and dirt. This gives an extremely clean and tough metal for sand castings, but one which is not especially suitable for forging, there being always some entangled alumina, which cannot be removed and which may cause defects. Furthermore, this grade of bronze hardens too rapidly when

(*Continued on page* 264b)

Composition of Various Grades of Zinc

	Font-d' Art.	Electrolytic.	Willemite.	Dross.	P. W.	Scrap.
Aluminum	.....	0.0005	nil	nil	nil	.....
Antimony	.....	nil	nil	nil	trace	.....
Arsenic	.....	nil	nil	nil	trace	.....
Cadmium	0.123	nil	0.002	nil	0.024	0.003
Copper	trace	0.0120	0.001	nil	0.001	0.060
Iron	0.020	0.0003	0.003	0.009	0.024	0.030
Lead	0.135	0.0193	0.039	0.057	1.448	2.050
Silica	.....	0.0009	nil	nil	trace	.....
Tin	.....	nil	nil	nil	nil	1.410
Zinc	99.718	99.9670	99.955	99.934	98.503	96.447

Checking Losses in the Storeroom

BY MEANS of the "balance of stores" system of issuing, handling and accounting for materials, a complete record of all supplies and products may be maintained. Four fundamental requirements must be taken into consideration. These include accurate payroll distribution, accurate stores accounting as applied to material disbursements and net receipts, accurate bookkeeping and equally careful accounting of production.

By Wilfred G. Astle

THE balance of stores system, of issuing, handling and accounting for raw materials may at first seem overwhelming to the managers of small concerns, who may consider it too elaborate for their needs. It is well to remember, however, that the broad general principles of a balance of stores system can be applied to business of any size, as are the principles of double entry bookkeeping. The late Frederick W. Taylor, who was probably the first man to study and work out the details of this system, laid great stress on the importance of the proper handling of stores; in fact, the efficiency engineer, when he is called in to direct a fight against waste and inefficient methods, usually attacks first the stores problem, which constitutes one of the greatest sources of loss. If an employe walked into the office, picked up a 50-cent piece, and put it in his pocket, he would promptly be discharged. In the storeroom, however, the careless handling, loss and even pilfering of material worth many times such a sum, is mildly deplored, but nevertheless considered a part of the game.

The usual storeroom losses can be classified as follows:

Loss due to carrying larger quantities of supplies than required; loss in delaying work or holding up the workmen; loss due to wasteful methods in the plant, and loss due to wasteful use of material, resulting from wrong methods of issuing and accounting.

The balance of stores system, when properly installed, becomes an important adjunct to the purchasing department, because the stores record can be used to answer the purpose of price cards and also take the place of the purchasing records as in the cases of firms or persons receiving orders.

Types of Organization

Three distinct types of organization exist at present among manufacturing enterprises. One of them is the old disorganized factory which has just "grown up". In it you will find the storeroom without any special system of control. The second is the factory which has discovered many wastes due to its unorganized condition and has taken means to check them. In this type of factory the storerooms are carefully looked after, separate departments and office force being provided for, and the authority of the persons in control of accounting and purchasing, is clearly defined in relations to the stores department. All material is carefully classified, definitely located and guarded by a proper system of requisitions, records and inventories. The third type includes firms which have adopted the scientific management system. In this type we will find that the material is not only guarded by systematic accounting, but a special clerk is provided to keep a balance of stores record. This clerk, being located in the planning office from which come all orders pertaining to stores, can tell at any time by means of his records and location chart, the status of any material and where it can be found.

In addition to systematized method, modern management requires that not only the material for the manufactured product, but all materials and supplies used in the plant, shall be controlled by the authority of the department of general stores. It is, moreover, not sufficient, under scientific management, to send a requisition to the stores for needed material. All orders which require material must go through the balance of stores clerk's hands before they are honored. He examines all items and assigns them to a specific order, after which these items of material are not available for another order which may follow. This is done before the materials are required for use, and serves as an advance notice to the stores clerk of any unexpected demand for a particular material. This makes it possible to renew supplies on short notice. The planning department plans out the movement of the material from the stores department to any particular place where it is needed, also providing for the

BALANCE OF CLASSIFIED STORES. When quantity available falls to..... Symbol.
Description of article. Issue requisition for .....

Column 1. Stores ordered but not yet delivered.						Column 2. Stores on hand in the storeroom.					Column 3. Stores apportioned to an order but not yet issued.				Column 4. Stores available.		
	Date ord'd.	No. of pieces or quantity	Date rec'd.	Purchase order No.	Date to be delivered	Date rec'd.	No. of pieces or quantity.	Date issued	Issued for Order No.	Purchase Order No.	Date apportioned.	No. of pieces or quantity	Date Issued	Order No.	Date	No. of pieces or quantity	Remarks

NOTE:- When stores are ordered, add the quantity to columns 1 and 4. When stores arrive, subtract the quantity received from column 1 and add to the quantity received to column 2. When stores are apportioned, subtract quantity from column 4, and add quantity apportioned to column 3. When stores are issued, subtract quantity from columns 2 and 3. In all cases bring down at once balance on hand in each column affected.

FIG. 1—FORM USED FOR BALANCE OF STORES RECORD

CHECK BALANCE SHEET.

Storeroom..... Month | Day | Year

Mr.....

I have to-day counted the following materials in stores and have corrected the tags and balance sheets where necessary.

Symbol	Description	Actual in bin.	Shown on tag.	Shown on balance sheet.	Remarks

Note:- When actual balance is below ledger balance. Balance of Stores Clerk will make his entry in red ink.

.....
Stock Clerk.

.....
B. of S. Clerk.

.....
Storekeeper.

FIG. 2—CHECK BALANCE SHEET

return of material as partly finished or finished product.

It is sometimes desirable, in the installation of a system of this nature to carry stock for the ledgers in groups. For instance, one group would include all staples and another group would include all goods purchased for a particular purpose or job. Such material has usually been handled by a direct requisition on the purchasing agent, from the department requiring it. The goods are delivered immediately to the person or department issuing the requisition. This procedure might seem to be logical and expedient, but in a great many instances it has caused much confusion and dissatisfaction because the man on the job receiving the goods is not concerned with the proper accounting for the material, his duty being merely to use it to the best advantage. Again, material has often been purchased outside, which could have been secured from stock. Critics may point out that vigilance in this care devolves on the purchasing agent and the storekeeper; but when a concern is carrying hundreds of thousands of dollars worth of material, storeroom records, not being considered as part of any regular stores record system, cannot and should not be expected to prove infallible. Nor can the storekeeper keep mental notes of everything on his shelves. In any system where an attempt is made to keep cost and statistical records, it is much more simple to do so where all supplies are handled through one source and by one method. Quite as much bookkeeping and clerical work are required in cases where two schemes involving considerable duplication are in practice, one for stores materials, the other for supplies not passing through the stores, as are demanded where one method is used for keeping track of both.

Before explaining the balance of stores system in detail, it might be well to examine the basis upon which the standards of maximum and minimum quantities are established. The minimum basis for general stores is the length of time necessary to replenish the stock from the market. If it requires a month after the purchase order has been issued, to get the material into the stores, then the minimum amount of any item must be sufficient to supply the factory for that period of time, at least.

The minimum basis for finished stores will depend upon the probable shipping orders at the various times of the year estimated from past records, upon the time necessary to get various items into stores from the market, and upon the time needed to complete the process of manufacture for a new stock. A minimum

Card No..... Bin No.....

Date Received Symbol, etc.

Month	Day	Year	

Name of Article

Date	Initial	Am. In	Am. Out	Am. Left

When only ..... left, write out a new ticket and send this to the Storekeeper.

FIG. 3—BIN TICKET

The Toronto Electric Light Company, LIMITED

Goods received by Stores Department

191 A

Order No.

From .....

.....BAGS .....BUNDLES .....REELS

.....BARRELS .....COILS .....

.....BOXES .....CRATES

WEIGHT..... CAR NO..... WAY BILL.....

Via .....

Charges .....

QUANTITY	DESCRIPTION	HOW USED: LOT NO.	WORK ORDER	ACCOUNT NO.

IMPORTANT

Full details of all Shipments received must be given above, and this form sent to Audit Dept. within 24 hours after receipt of goods.

Received by .....

Correct .....

FIG. 4—REPORT OF MATERIAL RECEIVED

stores amount is in effect an insurance against the losses which may occur when sales orders cannot be met on time. A failure in a firm's ability to deliver goods on time leads not only to cancellation of orders, but to a disorganized sales force and a skeptical market. When stores have been reduced to the minimum quantity, a danger point has been reached.

The maximum quantity for stores is a somewhat arbitrary factor, but the essentials to be considered are the fluctuations in the demand during the seasonal periods. For example, consider the months of September, October, November and December as one period. Suppose that during this period the average monthly sales are 1,000 units, but that the demand for October in some seasons, may increase to 1,500 or more, while November may run as low as 500. If we count on an average run of 1,000 per month, the finished stores on hand will run high during November. This surplus, however, will be absorbed during the next month. Thus we can estimate our maximum quantity at 1,500. A safer limit probably would be 2,000, since October's demand may exceed the 1,500 mark, and it is not advisable to cut into the minimum reserve, if it can be avoided.

Just as the minimum supply is a lower limit to insure against the possibilities of running too low, so the maximum quantity is a higher limit to insure against the over-production of stock and the danger of running too high. Fig. 8 illustrates this principle. In making up a schedule of maximum and minimum quantities, many variable factors must be kept in mind. Perhaps a plant may be capable of turning out 2,000 units per month, but this amount may not be the most economical quantity to be handled. This last feature may result in the modification of the maximum amount, since the loss due to carrying a greater number of pieces would be more than counter-balanced by the savings made in manufacturing the product in economical quantities. The same reasoning holds good for the general stores maximum. Buying material in certain quantities may be more economical than the savings made in carrying small amounts.

The record for material is as essential as a ledger is for accounting, and it is just as important to know what your material balance is as to know your bank balance. Fig. 1 shows a form suitable for a general stores record, which also constitutes a perpetual inventory. At the top of the form is the description of the article of which the record is kept. The accounting section includes four sets of columns. The first set deals with the number of pieces ordered through the purchasing department; the second set of columns are filled out from

Order No..... Requisition No.....

REQUISITION ON PURCHASING DEPARTMENT ONLY.

Ship to .....

Address.....

To be ordered from .....

Address.....

Charge.....F.O.B.....

Route.....

Quantity Wanted.	Lot No.	Description	On hand.

Approved by.....Approved by .....

Approved by..... Approved by .....

P.Agent.

Ordered By.....

FIG. 7—REQUISITION FOR SUPPLIES FROM DEPARTMENTS TO PURCHASING AGENTS

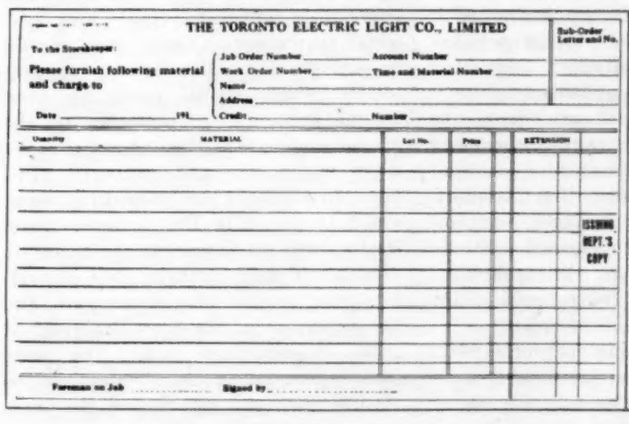


FIG. 5—REQUISITION FOR STORES

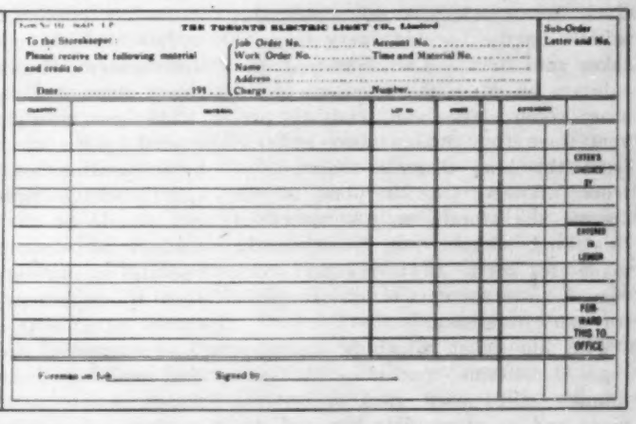


FIG. 6—CREDIT MEMORANDUM FOR MATERIAL RETURNED TO STOREROOM

the receiving department's memoranda of receipts and the stores requisition slips, while the third set forms a record of material reserved for production orders, which causes a draft on the stock of material. Reservation entries are made from the stores department's copy of each production order. The fourth set of columns shows the balance on hand in the storeroom, after deducting material in reserve for use on production orders already issued, but for which the material has not yet been taken from the storeroom. Actual count of material should be made as often as possible by the storeroom attendants, in order to check up the records.

Each day the balance of stores clerk prepares a list of material to be inventoried, as shown in Fig. 2. The clerk from the balance of stores department, to whom has been assigned the work of perpetual inventorying, takes this list and makes an actual count, shows the balance on hand, indicated on the bin card, and makes his returns to the balance of stores clerk, who checks against his stock records. This inventory work makes it necessary to show the last requisition authorizing the issue of the particular stock item under inventory. An accurate check is only rendered possible by making reference to some particular requisition. A bin ticket record system aids materially in promoting the accuracy of the record in the storeroom itself. Each stock clerk must enter his initials on the bin tag every time he takes out stock. This feature has a salutary effect on the accuracy of the store room clerks and tends to prevent them from taking more material from the bins than is required, or from allowing the surplus to lie around the storeroom. A record of this kind, should not, however, be made to serve as a regular stock record, since the data is only recorded for quick reference.

This bin ticket, which is shown in Fig. 3, contains spaces for the bin number, the mark number of the piece and its name, date received and symbol. At the bottom of the card is a statement of what is to be done when the minimum quantity has been reached. Below the general data, is the stock attendant's record, including columns for date and stockman's initials, also columns headed "Amount In", "Amount Out", and "Amount Left".

A temporary bin ticket can also be used for the purpose of drawing special attention to those bins in which the stock is running below the minimum quantity, and contains the same information as the regular ticket, except that it is bright red in color. This ticket is substituted for the regular one, the latter being sent to the storekeeper. When the regular ticket is returned, the red one is attached to its back and both are hung on the bin until stock is brought up to the required quantity. If the red ticket alone hangs on the bin, then it is known that the storekeeper has been apprised of the fact, but that the stock is below the danger mark. If both tags are hung up, it is indicated that the storekeeper has investigated the matter and that proper steps are being taken.

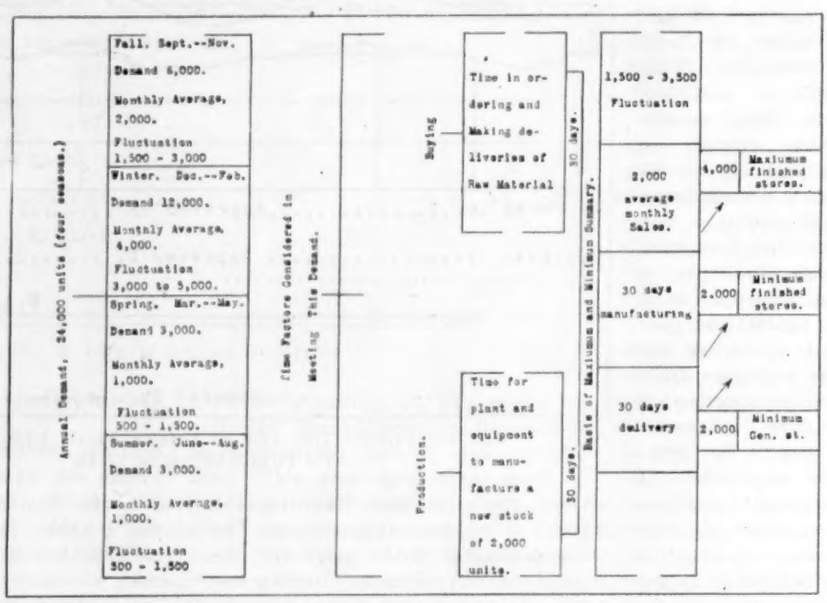


FIG. 8—PRINCIPLES OF MAXIMUM AND MINIMUM STANDARDS

The purchasing agent should be guided by the specifications furnished by those who have means of knowing exactly what is needed. Such authorities should be the manager, superintendent or storekeeper, who should operate by means of the system of requisitions, orders and receipts of the stores department.

New material should be received at the receiving department, where, by means of a form, shown in Fig. 4, all receipts of purchased materials are checked, and their weight and number entered for record. Under no circumstances should the invoice be used as the basis of checking. It is a good plan to make out this form in triplicate, sending a copy to each department interested, the original to the purchasing department; the duplicate with the material to the storekeeper, and the triplicate remaining permanently with the receiving clerk. The purchasing agent, upon receipt of his copy, checks it up, and forwards the original invoice to the storekeeper, who now has a complete file of forms in his records, showing the complete history of every transaction. These forms should all be in one color, with the exception of the dealer's invoice. The storekeeper now possesses all information required to meet any disputes which may arise with reference to the condition of material when received, its count, weight, quality, price, etc., before a record is made of these goods on the stores cards. This feature makes the record a reliable source of reference. Finally, when the storekeeper has checked and signed all the four forms, he sends them to the bookkeeping department for auditing. The storekeeper should always bear in mind that his department is similar to that of a retail store. He orders material, through the general requisition, from the purchasing agent, and then delivers it to the workmen over their general supply and material requisitions. Great care should be exercised in the issuing of materials, which should never be done except upon the presentation of the proper requisition slip, signed by the right authorities and properly filled out. In all cases this requisition form, which is shown in Fig. 5, issued from the department requiring the material, must show date, quantity, full description, the proper charge account, and the signature of the man ordering.

In supplying an order, the store man issues the material called for on the requisition, either to the man presenting the requisition or, in case

of large, bulky material, places it in out-going bins plainly marked as to whom the material is for, with the job number that it applies to. If the store man has time when the issue is made, he should enter the amount issued, the job number, and the date on the bin card, subtracting the amount issued from the amount on hand, so as to show the balance on the bin card. He should then copy the symbol of the material issued from the bin card on the requisition and should show the balance on the requisition, initialing this in the space provided. But should he be too busy to correct the bin card at once, he should put all the requisitions into a box marked "not worked", until such time as he can work them. After they have been worked, they should be placed in a box marked "worked". In the case of material issued many times during the day, the stock clerk should collect all requisitions calling for stock of one kind, add them up and make one entry of the total on the bin card, showing the balance on one requisition only. He should, however, initial all requisitions so as to show that they have been worked and included. These he should fasten together with the requisition that shows the total on top.

As soon as the general supply or material requisition has been honored, it should be sent immediately to the stores record office, where the amount of the material drawn should be entered in its proper place on the stores card, the proper balance figured and the price entered on the requisition. After these entries have been made, the requisition should be turned over to the cost department.

Some firms are not so formal in cases where stock parts are being made up. They provide a tag which accompanies the stock order of the individual parts through the shop. This tag is provided with a coupon which serves as an order and receipt for the necessary material. Thus no special requisition is required to draw material, but in case of special repair orders, assembly orders, etc., a material or supply requisition order as mentioned above, is used.

As each requisition is extended and the balance carried forward, the balance of stores clerk should observe whether or not the stock has reached the minimum. Upon this point depends the automatic arrangement of replenishing stores and he must use his own judgment in cases where the balance is just more than the minimum quantity, depending upon how often and how much material is used. Provided the amount on hand, as shown by the balance of stores records, and corroborated by the balance shown on the last requisition received from the storeroom, is down to the minimum, the balance of stores clerk will make out a requisition on the purchasing agent for the maximum amount, showing the description and all the necessary data. This card is shown in Fig. 7. It should be sent to the head of the department using of the material called for. He should also make out a "tickler" for each requisition sent out and should see that it is not held longer than two days by the department to which it has been sent. The requisition is then ready to go to the executive head delegated to approve all purchases. If the latter, after consideration of the material on order, deems it wise to continue to carry the amount shown in stock, he will O. K. the requisition and forward it to the balance of stores clerk. When it has been returned, properly signed, the balance of stores clerk should enter the data on his records as "on order", and send the requisition to the purchasing agent, who will place the order and send copies of the order to the balance of stores clerk and storekeeper, and the original to the firm receiving the order. He should also file two copies in his own office, one numerically, according to the order number, and one alphabetically, according to the name of the purchaser. He should also make out a "tickler" to be used as a follow up on the order, to assure its prompt delivery.

In operating a plant, it may often be necessary to requisition out of the stores a quantity of material or supplies in bulk for operating purposes. For example, a department may draw out 50 pounds of brass rods for turning purposes, though only 25 pounds is used. It would, of course, return the remainder and must, therefore, be given credit for it. To provide for such cases, a special credit slip as shown in Fig. 6, should be provided for all departments. It should be remembered that a proper system would charge all material drawn from stores to its proper account within 24 hours. Therefore, if subsequent information shows that more material was drawn than was needed, it is necessary to record this fact and give credit to the department or job returning the surplus material.

The bureau of standards, department of commerce, Washington, D. C., has issued scientific paper No. 254 entitled "A Study of the Quality of Platinum Ware." This paper, by George K. Burgess, physicist, and P. D. Sale, laboratory assistant of the bureau of standards, covers a series of experiments.

Iron in Western World

In a paper on "Iron Ores of the Americas", read by C. K. Leith at the recent meeting of the Pan-American Scientific Congress at Washington, the distribution of the present production of iron ores by kinds in the western hemisphere is summarized with the aid of table and charts. The distribution of the reserves is similarly summarized. A comparison is made of the distribution of the present production and the distribution of reserves, bringing out the fact that there are large reserves of ore in the two Americas which are not now being drawn upon. A summary is made of the factors which determine why certain ores are used and others not used. All these factors are summarized under the general term "availability." The point is made that the availability (and therefore value) is determined only in part by the intrinsic qualities of the ore and largely by the effort and money spent on the ore. Any intelligent formulation of laws of governmental control of ore reserves in the way of taxes or other measures requires careful consideration of this point in order that opportunity may be left open for the application of the human factors which so largely determine the availability and value of an ore body. Because of the great variety of factors entering into the problem, it is difficult, declares Mr. Leith, to forecast the distribution of future production of iron ores; but certain recent tendencies are enumerated, which seem to present certain changes for the future.

A circular issued recently by the Cutler-Hammer Clutch Co., Milwaukee, describes its magnetic separator pulley. This device, which is said to be especially adapted for steel plants, foundries, mines and cement plants, is designed to remove loose pieces of iron and steel. It is of particular value, where crushing or pulverizing machinery is used, for protecting the crusher blades by removing nuts, bolts, pick heads, etc.

The Electro Dynamic Co., Bayonne, N. J., manufacturer of interpole-motors, plans to increase its plant by an addition which will be approximately 100 feet square. The contract has already been placed with the John W. Ferguson Co., New York. The addition, consisting of one high story with mezzanine galleries, will be built on regular mill construction lines with brick walls and a felt and slag roof.

State Adopts Foundry Regulations

A COMPREHENSIVE and carefully prepared set of rules for the operation of foundries in the state of Pennsylvania, which were compiled by the industrial board of that commonwealth, recently became effective. These regulations are designed to effect the safety and comfort of employes in foundry establishments, and are known as "Safety Standards". They are similar to rules adopted by the New York industrial commission.

REGULATIONS governing the control of foundry operations in the state of Pennsylvania, known as "Safety Standards", which were compiled by the State Industrial Board, became effective Nov. 1. In many respects the provisions are similar to those adopted by the New York Industrial Commission, although many of the stringent requirements enforced by the latter are lacking. In Ohio, rules governing the equipment and operation of foundries are being drawn, and it is probable that in other states in which the foundry industry ranks high among the metal-working trades similar codes soon will be adopted. The standards to which Pennsylvania foundries must comply follow:

Definitions

An iron or steel foundry shall mean a place where iron or steel or both metals are melted and poured into molds in the making of castings, together with all cleaning, coremaking, drying, wash rooms and toilet rooms, used in connection therewith.

The term *entrance* as used in these regulations, shall mean main doorways opening directly to the outer air.

The term *gangway* as used in these regulations, shall mean well defined passageways dividing the working floor of foundries, but not the spaces between molds. Spaces between molds shall be divided into three classes, which shall be known as *bull ladle aisles, hand ladle aisles* and *buggy ladle aisles.*

Section 1.—Entrances to foundries shall be protected from Nov. 1 to April 1 of each year by a covered vestibule, either stationary or movable, which shall be so constructed as to eliminate drafts and of such dimensions as to answer ordinary purposes, such as the passage of wheelbarrows, trucks and small industrial cars. This regulation shall not apply to entrances used for railroad or industrial cars handled by locomotives or motors, or for traveling cranes, horse-drawn vehicles or automobiles; these entrances may remain open only for such time as is necessary for the ingress and egress of such cars, trucks and cranes, horse-drawn vehicles or automobiles. No locomotive shall be permitted to remain inside the factory during the loading or unloading of the cars.

Section 2. — Main gangways, where metal is carried by hand, bull or truck ladles, shall not be less than 5 feet wide. Truck ladle gangways which are not main gangways shall not be less than 4 feet wide. Bull ladle aisles between floors shall not be less than 3 feet wide. Single hand ladle or buggy ladle aisles between floors shall not be less than 18 inches wide. Where trolleys are used over molding floors for pouring metal, the aisles shall be of sufficient width to permit the safe ingress and egress of employes and the safe use of the ladles. Where it is necessary to occupy the central portion of the floor space in the production of castings, continuous gangway space shall be provided.

Section 3.—During the progress of casting, every gangway or aisle shall be kept entirely free from undue dampness or obstructions of any nature. Every gangway shall be kept in good condition at all times. Every gangway where industrial trucks are used shall be constructed of a hard material of substantial character and the top of the rail shall be flush with the floor.

Section 4.—Where smoke, steam, gases or dust arising from any of the operations of the foundry are dangerous to health or eyes and where a natural circulation of air does not carry off such smoke, steam, gases or dust, there shall be installed and operated hoods, ventilators, fans or other mechanical means of ventilation.

Section 5.—The cleaning and chipping of castings shall be done in cleaning rooms except that where traveling cranes or where, in existing installations cars are used for conveying castings into such rooms, a separating partition shall be erected which shall not be less than 12 feet in height. In existing installations, where the crane cage or crane girders will not permit the erection of a 12-foot partition, the height of the partition may be reduced sufficiently to permit of the clearance of same. Large castings may be chipped or cleaned by hand in the molding and casting room, provided sufficient protection is furnished by the use of a curtain or screen or some other means equally good to protect employes who are otherwise employed therein. This regulation shall not apply if mechanical contrivances are used for cleaning castings and the dust and particles arising therefrom are effectively removed at the point of origin by means of an exhaust system.

Tumbling Mills

Section 6.—Where tumbler mills are used, exhaust systems shall be installed to effectively carry off the dust arising from the cleaning of castings except where the mill is operated outside the foundry. This regulation shall not prohibit the use of a water barrel to clean castings. Sand blast operations shall be carried on in the open air or in a separate room used solely for such purpose. The milling of cupola cinders, when done inside the foundry, shall be carried on by an exhaust mill or water mill.

Section 7.—The floor beneath and immediately surrounding the cupola shall slope and drain away from the base of same.

Section 8.—Cores shall not be blown out of castings by compressed air unless such work is done outside the foundry or in a special room or dustproof enclosure. Men employed in cleaning castings by compressed air or sand blast shall wear eye guards and helmets.

Section 9.—Where natural light is insufficient properly to light the foundry, artificial light of sufficient power shall be provided.

Section 10.—Interior walls of foundries shall be whitened, in the discretion of the Industrial Board.

Section 11.—Proper and sufficient heat shall be provided and maintained in every foundry. Open fires may be used for the drying of molds or cores if coke containing less than 1 per cent of sulphur is used; also charcoal, gas or oils may be so used; where practicable, such drying of molds or cores shall be done at night.

Section 12.—All hand and bull ladles shall be dried in ovens or outside of the foundry. A sufficient number of sheet iron shields shall be available in iron foundries for use in covering hand bull ladles.

Section 13.—Suitable facilities shall be provided for the thorough drying of employes' clothing. Such facilities may be located in the wash room, the locker room, or in a room used exclusively for such purpose.

Sanitary Conveniences

In each foundry in which 10 or more persons are employed or engaged in labor, there shall be provided and maintained for the use of said employes in a place conveniently accessible and connected with said foundry in such a manner that access thereto can be had without exposure to the open air, a toilet room of suitable size wherein said employes may change their clothes; such toilet rooms shall be provided with wash bowls of sufficient capacity adequately equipped with hot and cold water service; such wash rooms shall be kept clean and sanitary and shall be properly heated during cold weather. There shall also be established and maintained separate from said toilet rooms, a suitable water-closet. The said toilet room and the said water-closet shall be connected with the foundry building in such a way that access thereto may be had without exposure to the open air and shall be properly heated, ventilated, cleaned and protected from the dust of such foundry.

Section 14.—Water-closets shall be provided in every foundry and for each sex, according to the following table:

No. of persons.	No. of closets.	Ratio.
1 to 10	1	(1 for 10)
11 to 25	2	(1 for 12½)
26 to 60	3	(1 for 16⅔)
61 to 80	4	(1 for 20)
81 to 125	5	(1 for 25)

For every unit of 45 or fractional part thereof in excess of 125 persons employed, one additional water-closet shall be provided.

Section 15.—One urinal shall be provided for 30 employes or less; two for 80 or less, and thereafter one urinal shall be provided for every 80 employed or fractional part thereof.

Section 16.—Wash basins with faucets

for hot and cold water shall be supplied according to the following table:

No. of persons.	No. of wash basins.	Ratio.
1 to 8	1	(1 for 8)
9 to 16	2	(1 for 8)
17 to 30	3	(1 for 10)
31 to 45	4	(1 for 11¼)
46 to 65	5	(1 for 13)

For each additional 25 employes at least one additional wash basin shall be supplied.

Section 17.—Wash rooms hereafter installed where 20 or more men are employed shall be provided with at least one shower bath with an ample supply of hot and cold water, and for every additional 50 men one additional shower bath shall be provided.

Section 18. — Individual lockers, arranged for locking, shall be provided for employes and shall be placed in a room used exclusively for such purpose, in the wash room, the drying room or at convenient places in the molding room. In cases of dispute the necessity for, and the number of, such lockers shall be determined by the Industrial Board.

Maintenance

Section 19. — Ladles, shanks, tongs, slings and yokes, skimmers and slag hoes used in the pouring of molten metal shall, prior to their use, be inspected daily as to their safety, by the men preparing and using same; and in addition a regular inspection as to their safety shall be made once a month by a man designated for that purpose. A monthly inspection shall also be made of the chains and cables on counterweights used in connection with drying ovens. Reports of such monthly inspections shall be made on forms prescribed by the Industrial Board and shall be kept on file for their examination.

Section 20.—All fire ways connected with drying ovens, when built in the floor, shall at all times be protected by either a substantial protecting cover or a standard railing.

Section 21.—All trap doors shall be guarded when open, either by standard railings, as described in Section 20, or watchmen, and all pits shall be properly covered or railed when not in use, and sufficiently guarded at other times.

Section 22.—All passageways and stairways shall be properly lighted and inclined runways and stairways, charging decks and platforms shall be safeguarded with standard railings as described in Section 20.

Section 23.—All ladles pouring from the lip, of 2,000 pounds capacity, or more, shall be equipped with a worm geared device for tilting the same. All ladles not so equipped, shall be changed to conform with the above regulation on or before Sept. 19, 1917. All crane truck and trolley pouring ladles shall be so constructed that the center of gravity shall be below the bail unless ladles are equipped with a geared device approved by the Industrial Board; and shall be equipped with a clip to prevent overturning.

Section 24.—Trunnions on flasks shall be capable of sustaining the loads they are required to handle. Trunnions hereafter constructed shall be carefully designed to carry the load they are to handle and constructed with a factor of safety of at least 10, including bolts where they are used. The diameter of the button shall be equal to the diameter of the groove plus one and one-half times the diameter of the sling used to handle the flask. Inside corners shall be well filleted and in order to prevent the sling slipping off or riding the button, the radius of the corner between groove and button shall be approximately equal to the radius of the sling used, the remainder of the inside edge of the button to be straight. All trunnions constructed after Oct. 1, 1915, shall bear the date of their construction.

Section 25.—The use of high explosives on the foundry premises for the breaking of castings is prohibited unless effective protection is provided.

Section 26.—The breaking of castings by the use of a drop inside the foundry during working hours is prohibited.

Where a drop is used for the breaking of castings or scrap outside of the foundry a permanent shield of heavy planking or other effective protection shall be provided.

Section 27.—Every employe shall use safety devices furnished for his protection by the employer, where there is a hazard connected with his employment.

Section 28.—Where rooms in which core ovens are located adjoin rooms where cores are made by females and where the making of cores and the baking of cores are simultaneous operations, the partition between such rooms shall be constructed of concrete, hollow tile, brick, metal, or other material approved by the Industrial Board and there shall be in such partition only such openings as are required by the nature of the business.

Section 29.—All openings in partitions between the core oven room and the room in which females are employed shall be vestibuled with a revolving device or double doors which shall be self-locking, or any other self-closing device equally effective, which shall be approved by the Industrial Board. Such device shall be kept in such condition that gases, fumes, and smoke shall be effectually trapped.

Section 30.—No female shall be allowed to handle cores which have a temperature of more than 110 degrees Fahr.

Section 31.—No female shall be permitted to make or handle cores when the combined weight of core, core box and plate at which she is working exceeds 15 pounds.

Brass Foundries

The term *brass foundry* shall mean a place where brass, aluminum, copper, tin, zinc, gold, silver or composition metals containing any of the foregoing metals are melted or poured into molds in the making of castings, except that foundries where aluminum only is melted shall be covered by regulations governing iron and steel foundries.

The term *cellar* when used in these regulations shall mean a story more than one-half below the level of the ground surrounding the building.

The term *basement* when used in these regulations shall mean a story partly, but less than one-half below the level of the ground surrounding the buildings, and shall be considered the first story of such building.

Section 32.—The regulations relative to dust, smoke, gases or fumes, ventilation, sanitation, heat, light, gangways and aisles, safety appliances, washrooms, cleaning rooms, drying and locker accommodations, as specified for iron and steel foundries, shall apply to brass foundries, except that main gangways shall not be less than 4 feet wide and gangways between molds on spill troughs shall not be less than 3 feet wide.

Section 33.—When the crown plate of an upright melting furnace is elevated above the surrounding floor in excess of 12 inches, the furnace shall be equipped with a platform guarded with a standard railing; and such platform shall be constructed of metal or other fire-resisting material, and shall extend along the front and sides of the furnace, flush with the crown plate and shall be at least 4 feet in width and shall be clear of all obstructions during pouring time. If the platform is elevated above the floor in excess of 12 inches the lowering from same of crucible containing molten metal shall be by mechanical means.

Section 34. — When the combined weight of a crucible, tongs and molten metal exceeds 100 pounds, it shall be removed from the furnace and deposited on the floor by mechanical means.

Smoke Finish

Section 35.—When smoke finish is desired on molds made on benches or tubs, smoke boxes which shall effectually trap the smoke shall be used; such boxes to be connected with flues to the outer air.

Section 36.—When molders work side by side at least 5 feet of space sideways shall be allowed for each man, and a clear space of 3 feet shall be provided back of each man.

Section 37.—Hoods shall be provided directly above all brass melting furnaces using gas or oil as fuel, which will effectually trap all gases and fumes generated in the melting of the metal; such hoods shall be provided with outlet pipes to lead the gases or fumes to outer air.

Ventilators shall be provided over all other furnaces used for melting brass or composition metal, to effectually remove the gases above the furnaces.

Section 38.—Brass foundries shall be provided with natural light from at least two sides or from at least one side, and skylights in roof.

Section 39.—All persons removing pots containing molten metal from furnaces or handling such pots shall be provided with protection for legs and feet.

Section 40.—Gangway dirt and floor scrapings shall not be riddled in the room where workmen are employed, unless it is so dampened as to prevent dust arising therefrom.

Section 41.—Stoves for drying molds, when located in the rooms used by workmen, shall be surrounded by a casing of fire-resisting material, to the full height of the stove at the discretion of the Industrial Board.

Section 42.—No brass foundry shall hereafter be constructed with a clearance less than 14 feet between the lowest point of the ceiling and the floor, except that where a peak, saw tooth, monitor or arch roof is constructed the side walls may be of a minimum height of 12 feet.

Section 43.—No foundry shall hereafter be located in a cellar or basement unless the ceiling shall be at least 14 feet in height, measured from the finished floor to the under side of the ceiling; and, if the foundry is located or intended to be located entirely in the front part of the building unless the ceiling shall be in every part at least 6 feet 6 inches above the curb level of the street in front of the building; or, if the foundry is located or intended to

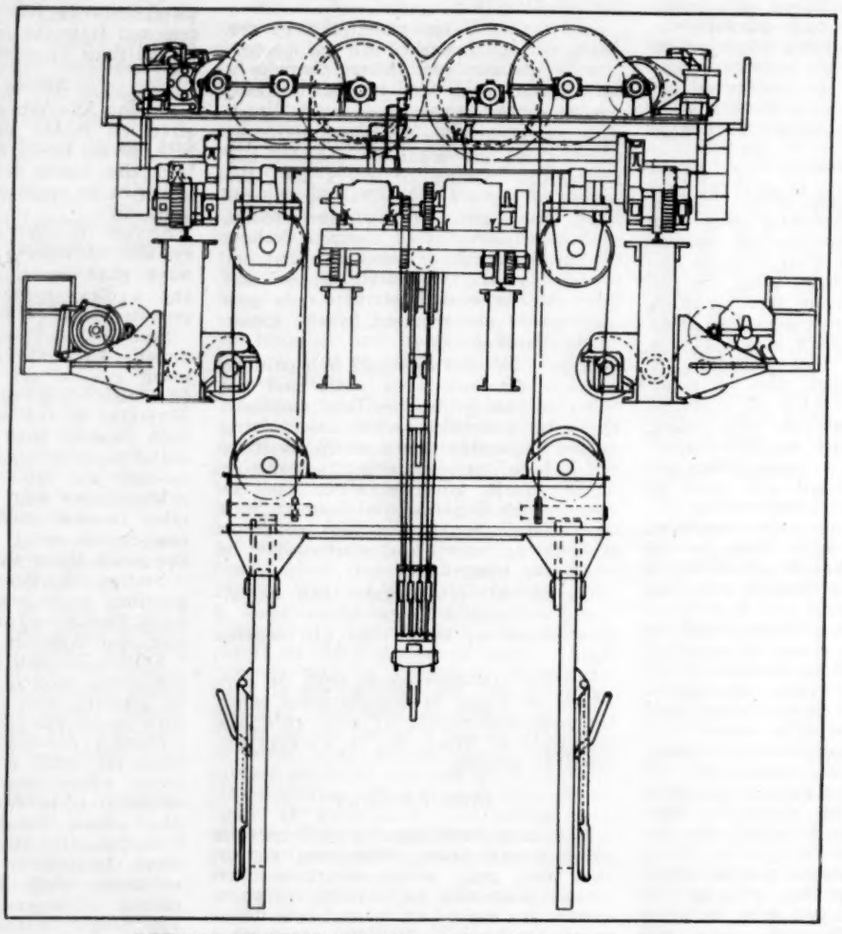
(*Continued on page* 264b)

Electric Cranes in the Steel Mill

CRANE EFFICIENCY, according to the author of this article, depends in great measure upon the ease of control and the conditions under which the crane man must work. The exclusion of dust and dirt, the method of braking employed, the accessibility and interchangeability of parts, and the factor of safety, are other important elements of design. Mr. Kendall describes numerous problems which confront crane manufacturers.

By H. E. Kendall

MANUFACTURERS of cranes are frequently confronted with obligations to customers, making it desirable, and sometimes even necessary, not to intrude too prominently their own ideas of what they might, as experienced builders, consider the better practice. In the development of steel mill cranes one must divorce the matter of cost entirely from the higher purpose of building the best machine possible, embodying every good idea obtainable from the various specifications submitted; and experience has shown that when cranes are so constructed, with a high quality of workmanship, the result has been invariably cranes such as are coveted for steel mills and are a joy to build.



DETAILS OF HEAVY LADLE CRANE FOR STEEL MILL

The efficiency of a crane depends largely upon the ease of control and the conditions under which the operator must work, which naturally leads to the subject of operators' cages and their location, and which again is influenced largely by local conditions. Standard practice is to place the operator's cage at the end of one girder so as not to interfere with the maximum lateral travel of the trolley and to allow the operator the best view of his hook and at the same time an unobstructed view of the runway. There are conditions which require special cage locations, such as where large piles of material obstruct the operator's view of the hook, when the cage may be placed at the middle of the span, or even attached to the trolley itself. The cage on the trolley may seem an ideal arrangement, yet there are reasons against this location which always must have consideration.

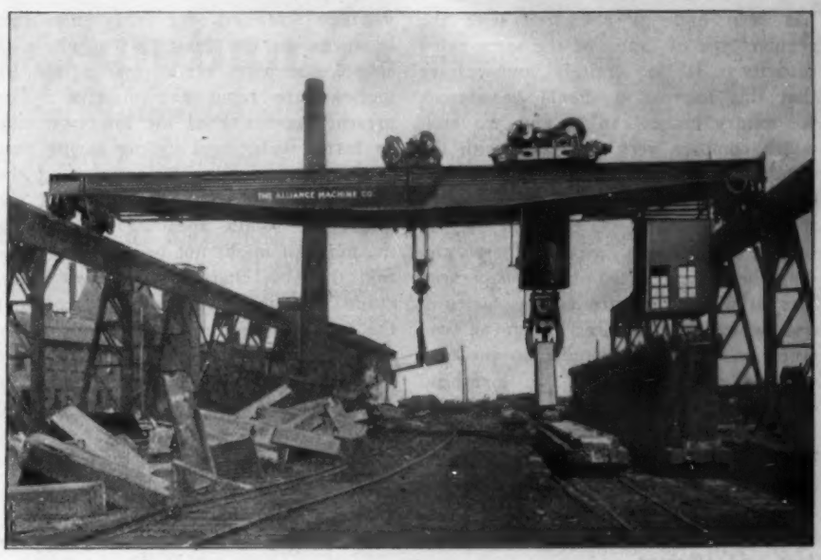
Objections to Cage on Trolley

For instance, the weight of the trolley is increased and the trolley travel is usually shortened, and further, the stopping of the bridge under these conditions must either be accomplished by an electric brake or by reversing the motors. The operator is necessarily crowded. This is particularly true if magnetic control is used, because the cage must always be made as small as possible in order to get the maximum range of trolley travel. On coal and ore bridges, and even on large gantries, these questions become less important, as a fixed cage places the operator too far from the seat of operation, this alone being largely the governing feature in locating the cage. On soaking pit and stripper types the question of cage location is always a serious problem, because it is essential that the operator be carried on the trolley and in such location as always to have the tongs of his machine in view when he is in the natural operating position. At the same time he must have protection from the heat. This same question arises in designing various types of charging machines. An unobstructed view of the interior of the furnace must be had by the operator, so he can make the various necessary movements without being obliged to assume tiresome or dangerous working positions. The dust and dirt encountered in mills is a serious enemy in the maintenance of electrical equipment, and to accomplish the best results the switches and relays used with magnetic control should be given the best protection and the most liberal space possible. The Alliance Machine Co. has gone so far in several installations as to place the controller panels in steel cases which are equipped with wire inserted glass doors.

The question of lowering a load and yet having it under absolute control of the operator at all times has been, and

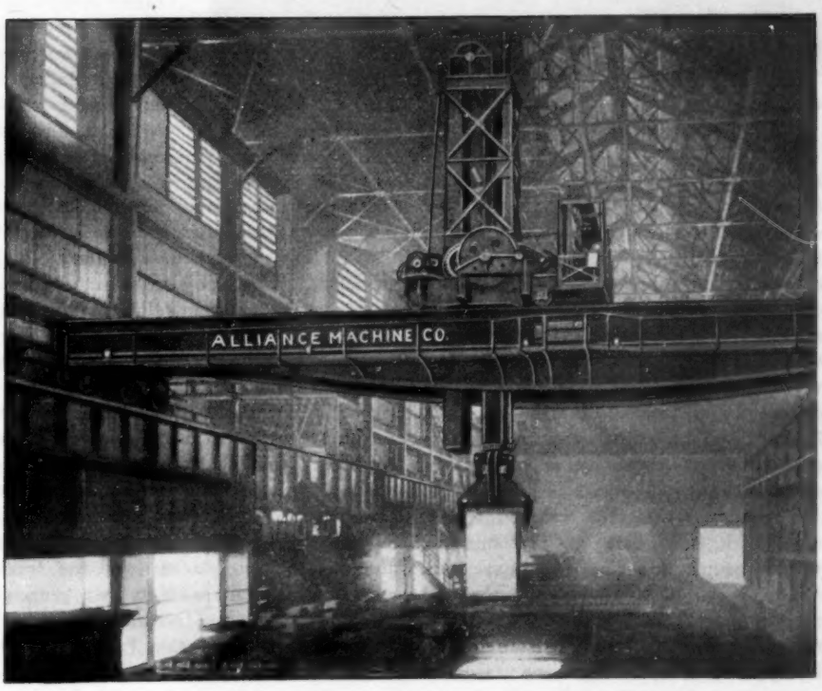
From a paper read at the ninth annual convention of the Association of Iron and Steel Electrical Engineers, Detroit, Sept. 8 to 11, 1915.

always will be, more or less of a serious problem. To accomplish this, the three methods are employed, the older and more widely known being, of course, the mechanical brake; dynamic braking is a more recent development. The still older method of hand or foot operated braking leaves the matter of lowering the load entirely up to the operator. This last form is of course seldom used, although some conditions make this method desirable, for example, where gravity lowering and speed are essential and at the same time a quick smooth stop is necessary. It is not too much to say that its simplicity will cause dynamic braking to be used more universally than it has been in the past. In saying this I do not mean to overlook the advantages of mechanical brakes, where their use is desirable. Mechanical brakes, which are submerged in oil, dissipate as far as possible, heat generated by the friction plate, as well as adding life to the frictional surfaces. The friction plate is perfectly free to rotate in the hoisting direction, but is positively held from rotating in the opposite direction by means of a positive driven automatic key, which requires no adjustment whatever. Special emphasis is also laid upon this method for holding the friction plate, for not only being positive in its action, it is also extremely quick in its operation. Frictional devices for holding the plate will in course of time wear and require adjustment, else at some critical moment they may let the load overhaul. Back lash, due to the holding mechanism failing to take immediate hold, not only places a great strain on the whole machine, but also makes it impossible for the load to be handled with any degree of exactness.



HEAVY ROPE TYPE STRIPPER CRANE

Too much stress cannot be placed upon accessibility, and in this may be included interchangeability. The best machines require repairs and replacements, and as many steel mill operations are directly dependent on cranes and all operations indirectly so, it must be the aim of the manufacturer to make these necessary delays as short as possible, for the real worth of a crane can only be determined by the number of hours of service it gives every day of the year. In all classes of gearing each shaft should be so arranged that it may be removed without disturbing its gears and pinions, or any other shaft, gears or pinions adjacent thereto. This arrangement requires all bearings to be provided with caps and split bushings. All track wheel bearings are so arranged that by simply relieving the weight from the bearing, the track wheel and gear may be removed. The gears on the track wheel shaft are kept properly in mesh by inserting liners between bearing and frame, thus permitting adjustment and use of the brasses until entirely worn. Access is provided to all bearings that require inspection and lubrication. Universal couplings on vertical shafts of the bridge drive of gantry cranes are reached by platforms and ladders designed for easy access, and the compensating trucks on overhead cranes are provided with platforms on the inside of the carriage to give ready access to wheels and bearings. Cranes are provided with footwalks, not only to give access to the bridge driving mechanism, but also to the trolley, whenever the clearance permits.

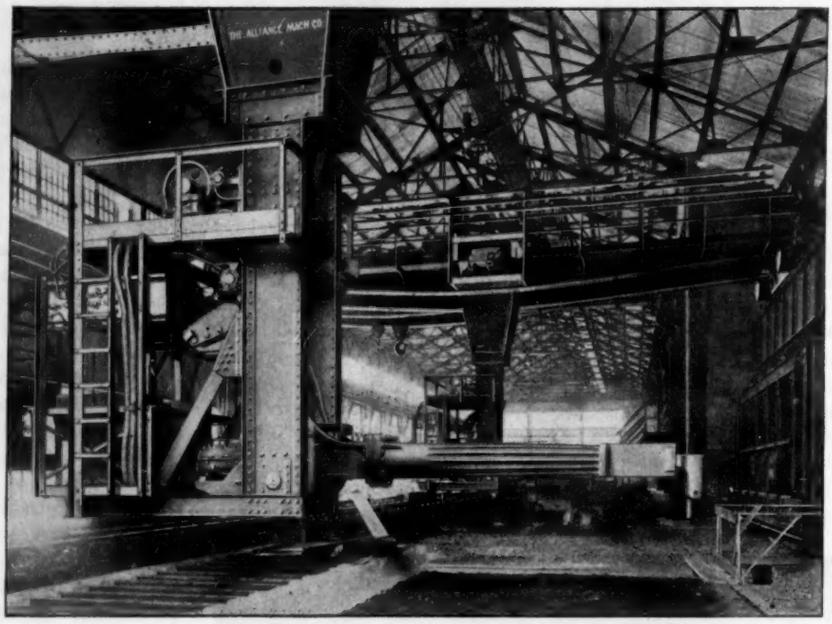


LARGE SOAKING PIT CRANE IN OPERATION

With the new type of ladle trolley two motors are used, located over the main girders in the most accessible position and always away from the heat arising from the ladle. The drums are placed in the center of the trolley with their gears interlocked, each drum having its own gearing, motors and brakes, exact duplicates of each other.

The following brief description of various types of machines will illustrate what our experience teaches us to be a satisfactory design to perform the various operations in the most efficient manner. For convenience we take up the gantry crane first. In the past it has been considered by many people the most inefficient and unwieldy type of crane constructed. The upkeep expense

has been high as compared with the regular type of crane of the same rated capacity. It is entirely unnecessary that this impression should be abroad, for gantry cranes can be and are built which compare very favorably with the regular overhead types. The gantry crane uses the same type of trolley as the standard crane, placed upon the top of a box section girder, these girders being supported by well braced legs to which they are rigidly fastened, and which in turn rest upon an end truck, in every way similar to the type of end truck used on an overhead crane. With a rigid bridge that will remain square under the most adverse conditions, and with a carefully designed bridge drive, it naturally follows, therefore, that a gantry crane can, within reasonable limits, be made as fast and efficient in its operation as a standard crane of the same capacity. The stripper uses ropes and sheaves to do the work of the screw and nut. Instead of lifting the ingot and mold from 1 to 2 feet above the stool the rope stripper holds the ingot very close to the stool and merely pulls the mold off, and when the mold moves, the ingot, of course, drops back, but the distance is so small that in no case are the stools or buggies injured. Soaking pit cranes are built in two types, the high and low type. The high type is the more familiar. It lifts the ingot by means of a pair of tongs located at the end of a stiff leg or column which is raised or lowered by a rack and pinion, and, therefore, requires a high tower on the trolley for guiding it. The main advantage claimed for the low type is in the matter of overhead room, 12 to 13 feet only being required from runway rail to roof chord; this is obtained by the trolley having its tower hanging down between the guides. This tower acts as a guide for the stem which carries the tongs, the turning mechanism and hoisting sheaves. The tongs are raised and lowered by rope and sheave arrangement, instead of the rack and pinion. Low head room is not the only advantage claimed for this machine, however, as the design as a whole is simple, the parts are accessible and its motions are rapid and positive. The present popularity of the low type may be better understood by my saying that in the last two years 80 per cent of the pit cranes built by us have been of the low type. While speaking of charging machines, it might not be amiss to mention the slab charger. The two types, crane and floor, are both efficient and the type selected usually depends solely upon the mill conditions. Both types of machines are built for either end or side grip, but when the end grip is used the peel must necessarily have a horizontal lift in order to pick up material from the floor. With the side grip an elbow motion of the peel is utilized. It is to the demand on the part of steel mills that the crane industries are indebted for many of the modern safety features which are employed in crane construction. In all modern cranes as now built the standard factor of safety is five, but steel mill people are more exacting and these factors, while never less than five, vary and run very much higher in many parts of the crane, and the builder is governed largely by individual requirements in submitting specifications in this particular matter.



SLAB CHARGING CRANE AT GARY PLANT OF UNITED STATES STEEL CORPORATION

In designing a modern crane for steel mill work, all parts of the machine which require inspection and lubrication are made as accessible as possible, and all parts are carefully guarded to protect the inspector and operator from injury, and to encourage and facilitate attention and inspection, and thereby increase the life of the cranes. Platforms and ladders, frequently steps, are provided for the examination of all parts which may require attention. Footwalks extend the full length of the girders, easily accessible either from the runway or the operator's cage, they are also fitted to the trolleys wherever possible. The footwalks are built of steel with toe guards and hand railing. To protect those who work on the floor beneath the cranes, no over-hung gears or pinions are used, with the exception possibly of the motor pinions, and where these are overhung it is so arranged that should the pionion work off, it would be caught by the sub-pan which is affixed to the trolley. All gears, pinions and track wheels are guarded to prevent accidents, and sheaves also are guarded to prevent delays due to the rope jumping out of the groove. All hoisting mechanisms are provided with some of the many types of limit switches, and the selection of them, like the question of motors and controllers, is frequently left to the purchaser, but the types advised are those operated by the hook block. Here again the question of ladle cranes comes up. At one time the ladle crane was considered one of the most dangerous machines used in steel mill work, but this type of crane has received an unusual amount of attention in recent years and has been developed to a high degree of safety and efficiency. The first step was to eliminate overhanging drums by carrying the auxiliary trolley on a pair of auxiliary girders, placed between the main girders in such manner to allow the main hoisting ropes to pass between the main and auxiliary girders. Safety ropes have been added on the larger capacities, thus making this part of the hoist doubly safe. After this came the redesigning of the trolley with interlocking gears and two motors placed over the track wheels, each drum with its own gearing, motor and brakes. Dynamic braking is used exclusively on this type of crane and usually six brakes are employed, any three being designed to hold the load.

Exhibit Safety Appliances

Many Manufacturers and Users of Modern Devices for Lowering Accident Hazards Are Represented

With nearly 70 exhibits of the latest devices and methods for safeguarding life and bettering conditions in manufacturing and other industrial plants, the industrial safety exhibition of Ohio opened its doors on Monday at the central armory, Cleveland. This exposition, which continues to Saturday, Jan. 29, is held under the auspices of the industrial commission of Ohio, being combined with interesting round table conferences on accident prevention, many speakers prominent in industrial affairs taking part.

"This is not an entertainment, but a serious lesson in the prevention of death and accident," said Governor Willis. "More persons are killed by accident each year in the United States than the entire number of soldiers in the American and British armies in the Revolutionary war," said the governor. "And I am proud that our state not only is the first to take up work that is illustrated by this exposition, but leads the entire sisterhood of states in the preservation of life and limb."

The governor ended by lauding State Safety Director Victor T. Noonan, the exposition's planner, and predicted that the result of the exposition will be a further decrease in the number of industrial accidents this year.

The exhibits, which from the first were patronized by a large and keenly interested attendance, were extremely diversified, showing as they did, the development of every phase of safety and educative work in industry. The largest and most impressive display was that of the United States Steel Corporation, which included about 40 models of accident prevention and educative apparatus in use in its plants. Probably the most lasting significance attached to the corporation's showing of methods by which its employes are taught, not only to make thoughtful care and intelligence a part of their work-day lives, but also to improve their living facilities and in general to raise their standards of cleanliness and comfort. Large revolving octagonal stands, whose sides were composed of illuminated transparencies, depicted various instances of carelessness and its results, "before and after" pictures of cleaning-up crusades, methods of performing dangerous tasks, and the like. A group of danger signs in half-a-dozen languages was also of particular interest. Other interesting exhibits included those of the Brown Hoisting Machinery Co., Cleveland, which showed a safety hook, a portable floor crane, a triplex block, a safety winch, and other safegaurded hoisting equipment; the Julius King Optical Co., New York, foundry, welding and miners' goggles; the Northern Blower Co., Cleveland, exhaust hoods and compartments for grinding, chipping and sawing operations; the Norton Co., Worcester, Mass., safety guards and hoods for grinding wheels; Pickands, Mather & Co., Cleveland, mine rescue and emergency hospital equipment; the Surety Guard Co., Chicago, automatic saw and drill press guards; J. A. Woodford & Co., Youngstown, O., jointer guards; Wheeling Corrugating Co., Wheeling, W. Va., corrugated fire and sanitary receptacles; the Strong Kennard, & Nutt Co., Cleveland, foundry, miners', smelting and welding goggles; the DeVilbiss Mfg. Co., Toledo, paint and varnish spraying devices; and the Multi-Metal Separating Screen Co., New York, sand blast helmets. Other exhibits of interest to the iron and steel industry included those of the Cleveland Fabric Belting Co., Cleveland; the F. A. Hardy Optical Co., Chicago; the American Car & Foundry Co., Chicago; the Buckeye Steel Castings Co., Columbus, O.; the Ralston Steel Car Co., Columbus, O.; the American Rolling Mills Co., Middletown, O.; the American Abrasive Metals Co., New York; the Humason Saw Guard Co., Youngstown, O.; the Republic Iron & Steel Co., Youngstown, O.; the Youngstown Sheet & Tube Co., Youngstown, O.; the Safety Emery Wheel Co., Springfield, O.; the Whitaker-Glessner Co., Wheeling, W. Va.; the Portsmouth Steel Co., Portsmouth, O., and many others.

Discuss Safety Methods

Among those who took part in the discussions of safety methods, held during the exposition, were Stephen W. Tener, superintendent accident and pension department, American Steel & Wire Co., Cleveland; Charles R. Hook, superintendent, American Rolling Mills Co., Middletown, O.; C. E. Pettibone, safety inspector, Pickands, Mather & Co., Cleveland; J. M. Woltz, safety director, Youngstown Sheet & Tube Co., Youngstown, O.; Fred W. King, Julius King Optical Co., New York; W. H. Cameron, secretary National Safety Council, Chicago; H. L. Gaddis, safety inspector, Ferro Machine & Foundry Co., Cleveland; Fred Bennett, safety director, Buckeye Steel Castings Co., Columbus, O.; Homer J. Weeks, safety inspector, American Steel & Wire Co., Cleveland; and L. H. Burnett, assistant to the president, Carnegie Steel Co., Pittsburgh, Pa.

Lake Carriers

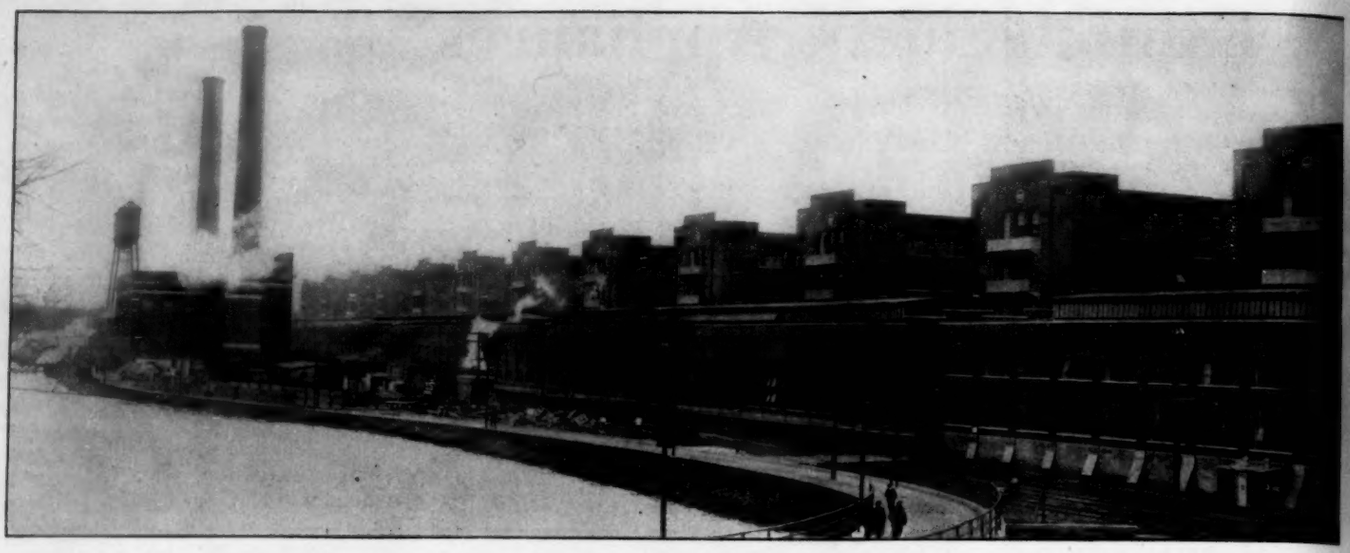
Prepare for Busy Year — Interesting Features of Banquet

The establishment of additional aids to navigation which will assist in preventing accidents and thus facilitate the rapid movement of iron ore, formed one of the principal subjects of discussion at the annual meeting of the Lake Carriers' Association held at the Statler Hotel, Detroit, Jan. 20.

The Lake Carriers went on record as favoring two 800-foot channels opposite Port Huron rather than a single 1,600-foot channel, it being the consensus of opinion that the double channel is much safer. Steps also were taken looking toward the installation of semaphores at the upper entrance to the Livingstone channel and the St. Clair Flats canal in order to enforce the maintenance of an arbitrary interval of five minutes between vessels using these waterways.

The retiring officers were re-elected as follows: William Livingstone, president; J. H. Sheadle, vice president; Harvey D. Goulder, counsel; George P. McKay, treasurer; George A. Marr, secretary; A. R. Rumsey, chief shipping commissioner. The retiring directors, 38 in number, also were re-elected, and in accordance with a resolution passed at the meeting, two additional members were elected, bringing the board up to 40; the new members are C. L. Hutchinson and E. C. Collins.

At the annual dinner Thursday evening, Henry D. Estabrook, of New York, prominent in politics during President McKinley's first administration, was the principal speaker. Other speakers included Charles F. Marvin, chief of the weather bureau, and Alexander Johnston, deputy minister of marine, Dominion of Canada. The banquet also was featured by speeches over the long-distance telephone by men prominent in maritime affairs in San Francisco, including Captain Robert Dollar, J. J. Tynan, general manager, Union Iron Works Co., M. H. DeYoung, publisher and editor, *San Francisco Chronicle*, and J. K. Lynch, president of the American Bankers' Association.



New Plant of the Remington Arms & Ammunition Co., Bridgeport, Ct. The Power House and

Huge Remington Small Arms Factory

THE LAVISH expenditure of money and an almost uncanny effectiveness in co-ordinating resources has unfolded a wonder-story of American business enterprise in the creation of the huge new plant of the Remington Arms & Ammunition Co. In March, 1915, an army of about 2,000 laborers was turned loose to clean up some swamp land in the city of Bridgeport, Conn. At the same time carloads of construction material began to arrive on the ground and structures rapidly took form until, by December, an immense new plant had been built, which, when it is in full operation, probably will be the greatest small arms plant in the world. These few figures indicate the magnitude of the great establishment: Its erection cost approximately $12,000,000, the total floor area is 1,545,000 square feet; the window space embraces 350,000 square feet of glass secured by 160,000 pounds of putty; 15,000,000 board feet of lumber, mostly yellow pine and hardwood, 11,500 tons of structural steel and 20,000 cubic yards of concrete were used in the construction. To operate this great plant 18,000 skilled men will be required and these are being taken on as fast as the machinery can be installed. At the present time, approximately 6,000 men are at work and new men are being engaged at the rate of 2,000 a month.

The new plant is constructed on the unit system, thus permitting indefinite expansion if required. The factory comprises 13 main buildings, 12 service buildings, a dry kiln, five forge shops and a power house. Each of the main buildings is five-story, 62 x 274 feet, and each building is five stories, 50 x 77 feet. The service buildings connect the main buildings so that the space on each of the five levels of the plant is continuous throughout all the buildings. The connecting service buildings, in addition to housing the tools, gages and fixtures used in the corresponding main building, are given over to locker rooms, lavatories fitted with hot and cold water, shower baths and other conveniences for the men. One of the five forge shops is 64 x 192 feet, two stories. The others are one-story but are 64 x 352 feet each. The main buildings have a combined floor area of 1,204,200 square feet; the service buildings, 231,000 square feet, and the forge shops, 110,590 square feet. All the buildings are brick and steel, concrete being used for foundations in various parts of the plant. All upper floors are yellow pine planking, set on edge, with a hardwood finish.

The power house is 93 x 161 feet, 50 feet high, and has two stacks, each 200 feet high. The power furnished is sufficient to supply a city of 150,000 inhabitants with light and heat. The plant's capacity of 12,750 kilowatts is greater than the municipal plant at Bridgeport. The electric wiring from the power house and throughout the plant, it is estimated, totals approximately 4,500 miles. An interesting feature in connection with the power plant, is the securing of the water for the boilers from Stillman's pond. This body of water has been transformed into a lake by damming the water which formerly overflowed into the swamp that now forms the site for a portion of the new Remington works.

In addition to the new plant of the Remington Arms & Ammunition Co., huge extensions also have been made to the plant of the Union Metallic Cartridge Co., an affiliated company located immediately adjacent. When the war broke out 2,500 employes were at work at the Union Metallic Cartridge plant; at the present time, new operatives are being taken on as rapidly as possible and the total number of workers ultimately is expected to be 15,000. Thus, these companies expect to employ fully 33,000 individuals in Bridgeport alone, while counting those at their other plants will bring the total number of employes to approximately 50,000.

The influx of thousands of new workmen and the necessity of providing housing and other facilities for them and their families, has proved a problem too big for handling by the city of Bridgeport and as a result it was necessary for the companies to undertake colonization work on a large scale. Several large tracts of land were acquired by the Remington company and these were immediately cut into streets and building lots, and provided with sewers, gas and water mains, etc. On these tracts houses are being built as rapidly as possible. Many of the houses are of the apartment type, having quarters for four and six families, respectively, while others are two-family residences. To avoid the appearance of a com-

Guard Barracks are Shown at the Left and the Employment Bureau at the Extreme Right

Represents Effective "Preparedness"

munity town, no two of the houses will be alike, although all the dwellings of each kind have approximately the same floor space. The two-family houses consist of a living room, dining room, kitchen, three bed rooms and a bath room. Six-family and apartment houses having quarters for about 100 families have already been finished and, on the average, additional quarters for two families are being completed each day. The company is now erecting several hundred houses and this program will be continued until all the employes are provided with residences. The colonization plan includes the building of big esplanades, an athletic center and the construction of dormitories for housing 1,000 or more unmarried girls, who will be under the supervision of matrons.

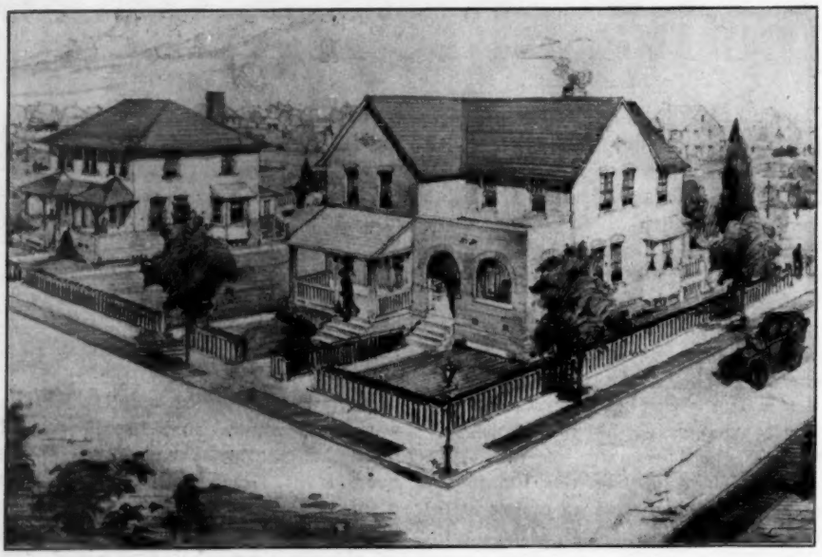
The lack of expert knowledge, in this country, in the manufacture of rifles for military use, was one of the great difficulties which faced the Remington company when the big European demand for small arms commenced. The manufacture of arms and ammunition for sporting purposes and their manufacture for military uses, are distinctly different, so that it was necessary to secure the services of men versed in the latter operation. Practically the only men in this country who thoroughly understood the manufacture of military small arms were a comparatively few officers stationed at government arsenals, most of whom were induced to leave the army and go with the Remington company within a few months after the outbreak of the hostilities in Europe. Chief of these is Major Walter G. Penfield, general works manager both of the Remington Arms & Ammunition Co. and the Union Metallic Cartridge Co. Maj. Penfield, before joining the Remington organization, had spent 18 years at the Rock Island, Watertown, Springfield and Frankford arsenals. He is recognized as one of the foremost experts on small arms in the country. The works manager of the Remington Arms & Ammunition Co. is Captain C. C. Sheppard, a graduate of the University of West Virginia. Before joining the Remington company, he had been an officer in the coast artillery corps and, later, in the ordnance department of the army. Naval Constructor W. B. Ferguson, a graduate of Annapolis, is head of the production engineering department, which embraces about 100 engineers and 110 draftsmen.

New workmen are engaged at the plant on the average of one every ten minutes. Owing to the great number of applicants to be interviewed, an elaborate system has been devised for weeding out the apparently competent men from the incompetent, without the waste of time and material due to faulty workmanship which often results when trying out new men. The employment department is located in a brick building which is provided with separate entrances for four classes of applicants: engineers, office clerks, etc.; tool makers and gage makers; machine hands, and unskilled workmen. The employing staff consists of 18 persons under the charge of E. W. Carpenter, the director of employment. The applicants are halted outside and briefly questioned, those who are manifestly unqualified for the work not being permitted to waste the time of the staff. The workmen particularly needed are toolmakers, gagemakers, drop-forgers, all-around mechanics, and wood-turners. The employment staff embodies experts in the various trades who, through questions, test the men as to their knowledge of their trade. The applicants come from practically all over the country, the majority, however, from New England. The care displayed in hiring workmen has resulted in approximately 88 per cent of the new men being retained permanently. The balance embraces 5 per cent who resign, and 7 per cent who are discharged for incompetency and other causes.

The problem of protecting the huge plant from fire was early recognized as an important one. The fire department, accordingly, was put in charge of a fire chief who, through long experience, coupled with a course of study at the New York Fire College, is thoroughly fitted for his duties. As organized at the present time, the fire-fighting force is of the regular factory type, consisting of 15 companies of eight men each. The members of these companies have all had experience in fighting fires. As the plant operates on a schedule of three eight-hour shifts, five companies of firemen are available in each shift. These companies are assigned to certain "districts", and leave their regular work, when an alarm is sounded, to

report immediately to the headquarters of that district. Assisting the chief are six lieutenants, two of whom are on duty each shift. One of the two remains at fire headquarters to receive alarms, while the other makes the rounds of the plant in order to detect any fire hazards which may be eliminated.

Every building is provided with automatic sprinklers. On each floor of all the buildings are two fire extinguishers, each provided with 150 feet of 1½-inch linen hose. Five two-wheeled chemical engines are distributed to the various levels in the main buildings near the center of the plant. In addition, one chemical engine is provided for use in the yard and another at the drying kilns. At various points in the plant fire hydrants are located. There are 14 of these hydrants, each



TYPE OF HOUSES NOW UNDER CONSTRUCTION

being housed and equipped with 150 feet of hose, axes, crow bars, etc. In addition, there are four hose houses, each of which has a two-wheeled hose reel carrying 500 feet of hose. One of these hose reels also is located at fire headquarters. This equipment is supplemented in the power house by two 1,000-gallon, two-stage centrifugal fire pumps. For supplying the sprinkler system, there are two steel tanks having a capacity of 100,000 gallons each. These tanks are located 35 feet above the level of the highest sprinkler.

An efficient organization has been built up, which is charged with the responsibility for safeguarding the workmen. This department is in charge of a safety engineer, who submits his recommendations in regard to safety appliances to the enquipment engineer. The safety-first engineer's sole duty is to provide safety devices wherever they can be used to advantage and to see that safety rules are obeyed by the workmen in general. The safety-first department uses half of a floor in one of the main units for experimenting and for making models of various new safeguards. After the models are made, contracts are let to outside factories for the manufacture of the devices in the quantities wanted. The safety-first engineer also posts notices, photographs, etc., throughout the plant which emphasize the importance of the workmen taking proper precautions.

One of the many features which attracts one's attention at the huge new plant is the extremely efficient work of the small army of guards. These are provided for preventing disorder and for protecting the plant from undesirable visitors. The guard consists of 300 uniformed men, all of whom have an honorable discharge from the United States army or navy. They are organized on a military basis, being divided into three companies, each commanded by a second lieutenant. The guard is commanded by a former officer of the Massachusetts national guard, Capt. Inches, who is assisted by lieutenants. The guards are posted at the main entrance to the grounds and at every door in the plant. Permission to enter is granted only to the bearers of properly-issued passes, which must be shown by all the employes of the company, as well as by visitors.

For feeding the great army of employes, the company has equipped a restaurant and kitchen at an expense of about $40,000. This includes a large dining room which contains seats for 620 employes and standing room at lunch counters at the side for an additional 150. The men are allowed half an hour for lunch. Three meals are served daily, at 11:30 a. m., 12 o'clock and 8:30 p. m. The food served is the best obtainable. The catering privilege has been leased to the Interstate Co., and as this concern has no rent to pay and no equipment to furnish, it is able to supply the food at exceedingly low prices. Meals are served in the restaurant during the night for the night shift. For officers and heads of departments, meals are served in a separate grill room, which has a seating capacity of 50.

The company also serves hot food in all parts of the plant, for the benefit of those who find it inconvenient to go to the dining room. Eight "buffet-mobiles" are operated, each of which has a food capacity for feeding 300 men. These vehicles are a combination kitchen and lunch counter. The food, after being prepared in the main kitchen, is kept hot in the buffet-mobiles by electricity. A feature of the kitchen equipment is a refrigerating plant which makes a ton of ice a day.

The hospital system is exceptionally complete. The staff consists of a surgeon, day nurse, night nurse, clerk and porter. The average number of patients is about 100 a day. The company requires that all employes, no matter how slight their injuries, submit themselves for treatment at the hospital. The men are strictly prohibited from treating themselves, since numerous instances have occurred where slight injuries have become dangerous through infection. One of the rules in this connection, for instance, provides that no workman shall remove any particle which may enter his eye. As a result, 90 per cent of the cases treated in the hospital involve only slight cuts or scratches, cinders or dust in the eye, etc. The hospital is located on the fifth floor in one of the central buildings. It contains three cots, which are used until the patients can be removed to a regular hospital, and also a complete medical and surgical equipment. If badly hurt, the patients are brought to the hospital on stretchers, which are borne by the guards.

The welfare department is as thoroughly organized as any other branch of the business. It is in charge of J. A. Page, who had charge of the government welfare work on the Isthmus of Panama while the canal was under construction. Mr. Page attends to all grievances of the men. Discharged workmen may bring their cases to his attention and, if he finds that the dismissal was not justified he

brings the matter before the general works manager, and the workman is generally reinstated. The welfare department assumes the care of sick workmen. Another duty is to keep the men out of the hands of loan-sharks. When a man needs money, if his case proves worthy, he can borrow it from the company. Mr. Page has instituted a mutual aid and benefit association, a foremens' club and a messenger boys' club, all of which are managed by the members themselves. Another club, which is now being organized, will be for the benefit of the guards.

An exceedingly efficient division of the plant is the physical and chemical testing laboratory, which is under the direction of a former professor of machine design at the Sheffield Scientific School, Yale University. All raw materials received at the plant are tested in this laboratory, to determine their qualifications for their intended service. The scope of this work is indicated by the fact that different kinds of steels, meeting eight separate specifications, are required for various parts of a rifle. All steel is tested for hardness, tensile strength, elastic limit, molecular structure, etc. All supplies used in the plant also are tested, the company paying only for the value it receives. For instance, coal is bought strictly on its heat units, and if the samples do not yield the specified number when tested in the laboratory, the full price is not allowed on the particular shipment.

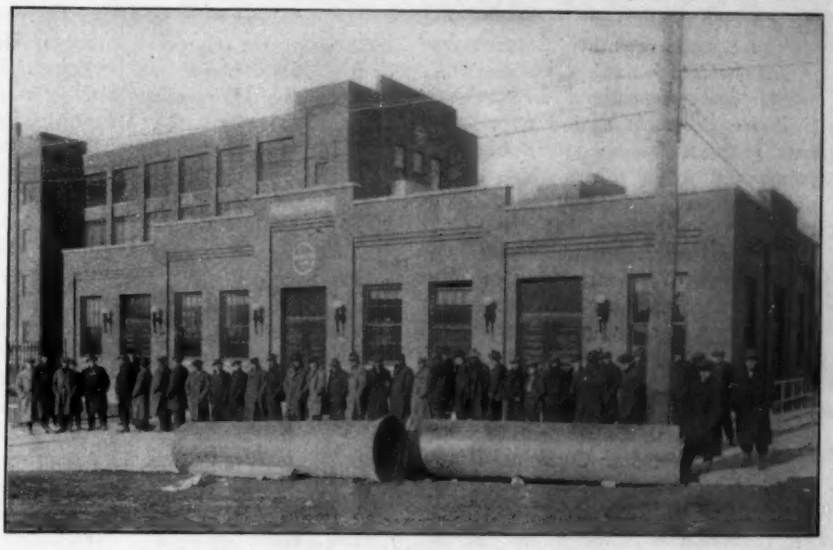
The sole owner of the huge factories of the Remington Arms & Ammunition Co. and the Union Metallic Cartridge Co. is Marcellus Hartley Dodge, a young man of 32, who was the heir of his grandfather, the late Marcellus Hartley. He is a son-in-law of William Rockefeller. Mr. Dodge's grandfather gave him a thorough business training and also instilled in him the spirit of devotion to the twin arms and ammunition enterprises.

The Union Metallic Cartridge Co. was established in 1867 by Mr. Hartley. In conjunction with the Winchester Repeating Arms Co., Mr. Hartley bought the Remington company at auction in 1888, later purchasing the Winchester company's interest and becoming sole owner. The Remington plant, incidentally, was the first in this country devoted especially to the manufacture of rifles. It was founded just 100 years ago by Eliphalet Remington, at Ilion, N. Y., who selected the materials for his first rifle from a scrap heap.

The present expansion of the business is the result of an unusual example of clear-sightedness. At the outbreak of the war, Mr. Dodge was in Germany. He at once made his way to Paris and then to London, returning to this country as soon as he had formed his conclusions relative to the needs of the situation. Despite the fact that no inquiries for war munitions or equipment to manufacture them, had yet been received in this country, Mr. Dodge foresaw what was coming and immediately gave orders to draft plans for a new plant. As a result, the contracts for the new buildings were let Jan. 18, 1915. Long before that, however, contracts for the necessary machinery had been let, as it was realized that the country's capacity for manufacturing rifle and cartridge making machinery was limited. As a result of these preparations, the Dodge plants were in position to book large contracts when the great flood of buying by Great Britain and Russia got under way.

A large share of the heavy responsibility for the great expansion at Bridgeport has devolved upon Samuel F. Pryor, who, in April, 1914, became associated with Mr. Dodge as vice president. Mr. Pryor had been vice president of the Simmons Hardware Co., St. Louis, and president of the Southern Car Wheel Co. Other executive officers are Charles C. Tyler, assistant to the vice president, who, with Maj. Penfield, is in charge of manufacturing; George Bingham, secretary and treasurer, and C. L. Reierson, assistant to the vice president.

The Remington Arms & Ammunition Co. embodies the small arms manufacturing department of the Dodge interests, while the Union Metallic Cartridge Co. is devoted to making ammunition of all kinds. The joint sales departments of the two companies have been known as the Remington Arms-Union Metallic Cartridge Co., with headquarters in the Woolworth building, New York. On Jan. 17, 1916, the Remington Arms-Union Metallic Cartridge Co., Bridgeport, was incorporated at Hartford, Ct., with a capital stock of $60,000,000 to take over and carry on the business of the Remington Arms & Ammunition Co. and the Union Metallic Cartridge Co.



A NEW EMPLOYE IS HIRED EVERY 10 MINUTES

New Company

Will Take Over and Rebuild St. Louis Blast Furnace

St. Louis, Jan. 25.—A company with a capital of $5,000,000 will be incorporated in Wilmington, Del., within a few days to operate a blast furnace plant in St. Louis. The principal stockholders will be Edward F. Goltra, Jesse D. Dana, John C. Roberts, R. H. Stockton, E. C. Dameron, William Bagnell, Davis R. Francis, P. C. Maffitt and T. S. Maffitt.

The company has acquired the property of the St. Louis Blast Furnace in South St. Louis, which will be rehabilitated and modernized, and put in readiness for operation within six months. The company states it has acquired a tract of 257 acres of iron-producing lands in Iowa, from which it will obtain its supply of ore, and with the advantage of cheap coke and river transportation, will be able to manufacture pig iron $2 a ton cheaper than it can be produced at Pittsburgh or any other iron center.

The Semet-Solvay Co., Syracuse, N. Y., has distributed a bonus among its employes at its several plants.

Business News of Nation's Capital

Industrial Preparedness Being Considered—Senator Cummins Has a Radical Plan

INSISTENT campaigns to arouse congress from its apparent apathy with regard to the question of national defense are taking into account the matter of industrial mobilization, along with the many other phases of the subject. Those who are devoting attention to the matter are earnestly in hopes that President Wilson in his forthcoming speaking tour, when he is expected to deal vigorously with the question of preparedness, will give some attention to the matter of industrial mobilization.

The peace-at-any-price advocates in their frenzied fight against a preparedness program are not overlooking any points, and among others which are the object of attack is the movement looking to industrial equipment that would be of the utmost importance to the nation in case of war. There are also those who, asserting that they are for preparedness, are desirous of seeing private makers of munitions of war put out of business and all manufacture of this kind taken up by the government. The most radical attempt in this direction is that being made by Senator Cummins, Republican, of Iowa, who last week delivered an address in the senate in support of his resolution in favor of the government acquiring plants to supply the army and navy with all arms, armament, and munitions of war, including ships and their equipment. While there is no reason to believe the matter of "nationalization" of munition plants will ever be passed upon favorably by congress, the Cummins resolution does represent the ideas of some few members of congress, and may be an influence tending toward some sort of a compromise measure that would insure greatly to the inefficiency of a system of national defense.

During Senator Cummins' address, he was interrupted by Senator Weeks, Republican, of Massachusetts, who inquired of Mr. Cummins:

"How would we, in time of stress, obtain our supplies unless we allow some one to make a profit out of the arms and ammunition which were going to be manufactured? Certainly it is not the purpose of the senator that the Government shall have a plant sufficient to supply our needs during a time of war."

"It is, Mr. President, my purpose," replied Mr. Cummins.

"I have not the figures before me," returned Mr. Weeks, "but it would require a plant that would cover the whole District of Columbia and probably the employment of 200,000 men."

Senator Cummins did not and could not make a satisfactory reply to Senator Weeks any more than opponents of industrial mobilization can justify their position. The war department's plan, as has been indicated some time ago, would be to encourage private munition plants so that they could be turned to in case of war, but has made no progress. There is no blinking the fact that, commendable as it is, it will face a hard struggle if it is given favorable consideration by congress in view of the apparently indifferent attitude of that body and the hostilities of some of its members toward the plan. Secretary of War Garrison and Brig. Gen. Crozier, chief of the bureau of ordnance, along with others connected with the war department, are earnestly desirous of seeing that congress heed their suggestion by which a sum not to exceed 25 per cent of the appropriations in the army and fortifications bills may be expended so as to render private plants quickly available. The bureau would, if this provision were enacted, be able to purchase machinery and other equipment for private plants making munitions and such plants would also be encouraged in view of the fact that they would know orders would be placed with them. It would justify their maintenance either in whole or part and would also cause other plants to be so arranged that they could be quickly converted for the manufacture of war material. During the past fiscal year, the war department spent between $5,000,000 and $6,000,000 for ammunition and artillery, most of which, of course, was made in the arsenals because of the present laws which prohibit the purchase of any substantial amount of material from private industries. It is feared that unless strong representations are brought to bear upon congress, it may continue its present policy of discouraging the private manufacture of war material. The topic was discussed in a general way during the convention here last week of the National Security League and steps may be taken to urge upon congress the importance of the subject. The President probably will receive a report before long from W. L. Saunders, who has been made head of the industrial commission he was asked to select to gather, in conjunction with the civilian naval consulting board, data, for use in organizing business for national defense in time of danger. The commission is to be made up of members of the five leading engineering organizations of the country, representing a membership of 36,000 technical men. The administration also is making inquiry as to mobilization of railroads, foodstuffs, etc. While it has been commended for this step, it has been criticised also for making some proposals which are held to be direct obstacles to its own program. Among these are plans for a government owned armor plate plant, and a government owned merchant marine, so-called, as well as the increasing tendency to give contracts to navy yards for ship construction. Former President Roosevelt has stated that the United States should at once begin governmental encouragement and control of our munition plants.

In the event that constructive legislation is enacted looking to the encouragement of private manufacture of munitions of war, it seems evident that there will be a strong attempt among some members of congress to bait the manufacturers through heavy taxes. One of the latest bills to be introduced on this subject was offered last week in the house by Representative Taggart, Democrat, of Kansas. In his measure it is proposed to levy a tax of 25 per cent of the net income of manufacturers of arms, ammunition, automobiles, or automobile trucks "for any foreign nation or for the use of any foreign nation or people, to be used for military or naval purposes in the prosecution of war."

Safety Bill Passed

Washington, Jan. 25. — The bill to create a bureau of safety in the department of labor, which passed the house at the sixty-third congress, but failed of the necessary attention in the senate, was again passed by the house last Wednesday. It was called up by Representative Lewis of Maryland, chairman of the house committee on labor and was passed unanimously. Only one amendment, offered by Representative Mann of Illinois, was added, and provides that

nothing in the bill shall be held to repeal, modify or affect any other act of congress at the time of the passage of the labor safety measure. Mr. Mann offered the amendment, he said, because there has been, on the part of the department of labor and others who are interested in the working of the department, some little fear that the bill might take away from some other official bodies of the government authority which had been conferred upon them by act of congress. Mr. Mann, author of the bill, said he thought the fear mentioned was not well founded, but in order to dispel it offered the amendment.

The bill provides that the bureau shall be headed by a commissioner of labor safety, to be appointed by the President, at a salary of $5,000 per year. Clerks, special agents and other employes are also provided for, and it would be the duty of the bureau, under the direction of the secretary of labor, to make general and special investigation and examination of labor safety plans and devices of all kinds and the need therefor, generally and specially, and also the study of devices and methods for the prevention of vocational diseases. Results of the investigations would be made public, as would also information regarding vocational diseases and the use of labor safety plans and devices. The public health service would be required to cooperate with the bureau in investigations as to vocational diseases, upon request of the secretary of labor.

"The ratio of accidents to the number employed in the United States," said Mr. Lewis, "I regret to say, ranks very much higher than it does in the countries of Europe. It would not be exaggerating the difference to say that the tendency in our industries is to kill and injure at least twice as many for a day's employment as experience shows abroad."

After the bill had passed the house during the sixty-third congress it went to the senate and was referred to the committe on education and labor, of which Senator Hoke Smith was and is chairman. The bill was allowed to lie in a pigeonhole in the committee room, despite urgent requests from manufacturers' and labor organizations, and others for its immediate passage.

Object to Rates

Washington, Jan. 25. — Complaint has been filed with the interstate commerce commission by the LaCrosse Shippers' Association, LaCrosse, Wis., alleging that present rates on pig iron from Alabama and Tennessee producing points to LaCrosse are unjust, unreasonable and discriminatory. Reasonable and just rates, which the complainant asks the commission to establish, are named as follows: From Birmingham, $5 per gross ton; from Chattanooga, Tenn., $4.75; from LaFollette, Tenn., $4.50.

Revision Suggested

Washington, Jan. 25. — Revision of southern railroads of their classification descriptions on certain iron and steel articles for the sake of definiteness is suggested in an opinion handed down last week by the interstate commerce commission. The suggestion was prompted by reason of the complaint of the American Steel & Wire Co., against a proposed classification by southern railroads on flat wire, which would have the effect of increasing the rates on that article. The classification, as originally planned, was withdrawn, and the complaint was therefore dismissed. But a new item was added, and became effective on Aug. 20, 1915, naming rates on flat cold-rolled or drawn steel.

Railroad Rate Harsh, Steel Flavor

Washington, Jan. 25.—The interstate commerce commission has further suspended until July 29, the operation of certain items appearing in supplement No. 2 to southern classification No. 41, Agent W. R. Powe's I. C. C. No. 20. The suspended items provide for an increase in the classification of popped corn and puffed rice confectionery, iron or steel spiral pipe, stock licorice, and ice-making or refrigerating machinery, in less than carloads.

Begins Steel Making

The River Furnace Co., a subsidiary of Corrigan, McKinney & Co., Cleveland, on Jan. 20 began initial operations of its open hearth steel department which has been under construction for months in the upper Cuyahoga river valley. Eventually eight open hearth furnaces will be embraced in the works' equipment. Steel was poured Thursday for first time from one of these new furnaces. Blooming mill, slabbing and billet mills are being installed and it is expected the entire plant will be in operation by March 1 at the latest.

The Independent Bridge Co., which recently acquired an 11-acre site on Neville Island, Pittsburgh, will begin the erection of a modern plant at an early date.

Steel Plant

Will be Erected by Trumbull Steel Co. at Warren, O.

The Trumbull Steel Co., sheet and tin plate manufacturer, plans to erect a steel plant on its site at Warren, O., to make special grades of steel. The company has sent out a letter to stockholders calling a meeting for Feb. 23, 1916, when the stockholders will be asked to vote on a proposed increase in capital stock from $4,000,000 to $10,000,000. The directors believe about $2,000,000 of this increase should be offered for sale now in order to provide funds for the proposed steel plant, while the remaining stock will be kept in the treasury for future use. The company now has a daily output of about 400 tons of finished sheet and tin mill products, and the extensions now under way, which will be finished in the summer of 1916, will increase this to over 600 tons a day. President Jonathan Warner advises *The Iron Trade Review* as follows:

"It is our intention to erect on our present site a steel plant for making special grades of steel. Our increased finishing capacity will probably be used to quite an extent to manufacture higher grades of sheets and tin plate of special analysis and the raw steel for such products cannot be purchased in the open market. For this reason we contemplate building a plant to manufacture such steel, and it will, at least in part, be non-competitive with any steel plant in this district. We expect now to increase our present capital stock of $4,000,000 to $6,000,000 or $7,000,000, and we have provided for whatever additional funds may be needed beyond this. We also expect to add another finishing line to our present ones, which now consist of black and galvanized sheets and tin plate of all grades. When our extensions are fully completed we expect to manufacture 275,000 tons of finished product per year, for which we will make in part our raw steel."

The Trumbull Steel Co. was incorporated in 1912, with a capital stock of $1,250,000, of which $1,000,000 was common and $250,000 preferred. On May 5, 1914, the stock was increased to $1,500,000 common and $1,000,000 preferred. On Aug. 6, 1915, the stock was again increased, this time to $2,250,000 common and $1,750,000 preferred. The preferred stock is entitled to 7 per cent preferred dividends and is callable on any dividend date after Jan. 1, 1918, 105 and accrued interest. The company has been operating since November, 1913.

News of Employers and Employes

Massachusetts' Contributions to New England Labor Troubles—
Eight-Hour Campaign Under Way

MASSACHUSETTS was the only New England state to furnish any strike developments the past week. Interest there centered in Westfield, where 500 of the 1,200 employes of the H. B. Smith Co., are still out on strike with indications of a peaceful settlement before the end of this week. Though extra police from various parts of the state have been on duty nearly two weeks, there has been no disorder and most of the state police force have returned to their respective homes. There have been numerous conferences during the week between representatives of the state board of conciliation and arbitration, officials of the company and the employes, resulting in the men refusing to return to work unless concessions are made. Other conferences are taking place this week. In the meantime the loop molders and coremakers in the North side plant are being organized into a union. All picketing has been stopped.

The plant of the Davis & Furber Machine Co., North Andover, Mass., employing about 800, is closed indefinitely with the exception of one department, as a result of a strike last week. Approximately 500 machinists, carpenters and molders left their work because the management refused to grant their demands for an increase of 15 per cent in wages. A compromise offer of 5 per cent with an additional 5 per cent in five weeks to those who had not profited by any advance during the past six months, was refused by the men.

The three mills of the Plymouth Cordage Co., Plymouth, Mass., employing about 2,000 hands, are closed because of a strike started by about 30 boy bailers, who quit work without giving any reason. The company offered to advance wages 5 per cent, but this was rejected at a meeting Friday night.

Because 32 out of 190 machinists employed at the United States arsenal, Watertown, Mass., received an increase in pay last fall, the other 158 are on the point of striking, unless their demands are satisfied by the government officials.

After voicing discontentment over being forced to work a 12-hour-a-day schedule for five days a week, employes of the Snell Augur & Bit Mfg. Co., Fiskdale, Mass., have started working a 13-hour schedule, which includes three nights a week, until 9 o'clock.

Eight-Hour Campaign

The eight-hour campaign that was started by the machinists last summer will be pushed in earnest this spring and plans are now being made for a general organizing movement that will embrace every city and town of size in New England. Plans for the New England booster campaign that is to be started were discussed at a meeting of all the international organizers and business agents in New England, in Springfield, Mass., Jan. 23. There are about 30 local unions which are of recent origin, having been formed since the general organizing campaign was started last summer. This was the first New England conference ever held, and the leaders believe that it will have good results in bringing about better organization work during the year.

Bethlehem Advances

Deferred announcement of an advance of 10 per cent to unskilled workmen, effective Jan. 16, has been made by the Bethlehem Steel Co. About 10,000 men are affected. Less than six months ago, the Bethlehem Steel Co. put into effect an advance of 10 per cent for both skilled and common labor.

Making Munitions

Massachusetts, through its hundreds of munition plants is contributing several million dollars' worth of explosives every 12 months to the belligerent nations of Europe, according to Edwin Mulready, state commissioner of labor, who is engaged in making a survey of the munition business in the state. Inspectors attached to the Department of Labor for the last few months have been investigating the munition situation in the state, and statistics already in the office of Commissioner Mulready indicate that Massachusetts is rapidly reaching the front rank of the states engaged in the manufacture of explosives.

The statistics which the commissioner's office is gathering are for a two-fold purpose. One is that the state authorities may know just what plants are manufacturing the explosives, or any part of them, and the other is for the purpose of ascertaining whether or not the state health and safety regulations are being observed in the manufacture of the munitions.

National Exhibit

There will be held in Washington during the week of Feb. 21-26 inclusive a safety-first exhibit in which all the government departments are taking an active part. This exhibit will take on a national aspect, as manufacturers and operators from all over the country are invited to be present in order that they may see what the government of the United States is doing in safety-first work.

Conditions Normal

The Massachusetts state board of conciliation and arbitration has issued a decision in the case of the Norton Grinding Co. and the Leland-Gifford Co., both of Worcester, to the effect that they are conducting their business in normal and usual manner and at a normal and usual expense. There is no truth in the statement that the board has called off the strike at the Norton Grinding Co. It has simply issued what is called a certificate of normality and the effect of this is that when the company advertises for help it is not obliged to state in the advertisement that there has been a strike or is a strike in progress at the establishment.

Literacy Test

Washington, Jan. 25.—Frank Morrison, secretary of the American Federation of Labor, appeared last week before the house committee on immigration in support of the immigration bill of Representative Burnett, which carries the literacy clause. A similar measure was vetoed during the sixty-third congress by President Wilson. Morrison said that only by limiting immigration can high standards of living and good wages be maintained among American workingmen. Representative Burnett said that of 2,500,000 foreigners in the United States, only 35,000 were attempting to learn English. J. O. Call, representing the chamber of commerce of Wil-

mington, N. C., opposed the bill on the ground that a colonization on farm lands near the city had been successful.

Preparing Demands

Cincinnati, Jan. 25.—The federation of the Cincinnati, Hamilton & Dayton railroad shop employes are preparing an agreement to present to the officials of the railroad company asking for higher wages and shorter hours for its machinists.

Unique Labor Leader

One of the most picturesque and popular figures in the iron trade of England disappeared recently through the death of William Aucott, the operative secretary of the Midland Iron & Steel Wages Board. Mr. Aucott attained the ripe age of 85, and probably passed away through a gradual senile failure. Nevertheless, he was a very useful member of the iron and steel community until 1912, when he retired. There was a very large and representative attendance of workmen and employers at the funeral. Probably no labor leader was ever so popular with ironmasters, owing to his scrupulous fairness and inflexibly high principle. Yet he never sacrificed in the slightest degree the confidence of his own class. Mr. Aucott never had any schooling, and was therefore entirely self-taught. Yet he was intelligent and well-read and must be largely credited for the maintenance of peace in the British iron trade for very nearly 50 years. He lived long enough to see the wage board one of the strongest and most respected institutions in the world, and there was, happily, a perfect understanding between him and Daniel Jones, the employer's secretary, during the whole period of their association.

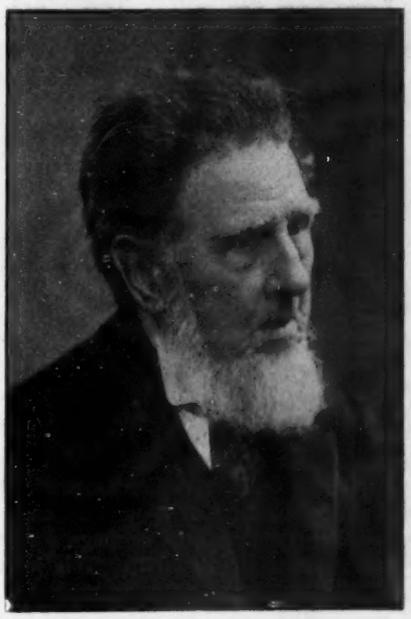
Mr. Aucott was an old Chartist, and in his early days took part in processions headed by a loaf attached to a pole and smeared with blood. Over 50 years ago he determined to fight strikes on the ground that, as he expressed it, they were "as silly as war." He was perfectly fearless of the angry ironworker, and has many a time entered a public house, seized and emptied on the floor the glass containing liquor of some intemperate workman, and so soundly berated him that he was glad to make his escape.

The National Radiator Co., with plants at Trenton, N. J., and Johnstown, Pa., is distributing a 10 per cent bonus.

Labor Notes

Ashland, Ky., companies have decided to increase wages, according to announcement which has just been made. The Ashland Steel Co. will increase the wages of the tonnage men 10 per cent, while those of common labor will be increased 10 cents a day. The Norton Iron Co., Ashland, has likewise announced that its iron carriers and common laborers will be given an increase of 10 cents a day, effective Feb. 1.

E. I. DuPont de Nemours & Co., Trenton, N. J., have sent to all salaried employes notice of the continuance of the 20 per cent cash bonus throughout the year 1916. This distribution will be paid by special check each month and this will be deducted from the



WILLIAM AUCOTT

amount that would otherwise be available for stock bonus.

The application of the International Silver Co., and Manning-Bowman & Co., Meriden, Ct., for a temporary injunction to restrain former employes now on strikes from interfering with the business, has been granted by Judge James H. Webb of the Superior Court in New Haven.

More than $20,000 has been distributed among the employes of the General Chemical Co., Union Hill, N. J. This is the first year the men have been given a bonus.

The number of strikers at the plant of the Crescent Fire Arms Co., Norwich, Ct., has been increased to 150. The trouble is over wages and working conditions.

A machine products exhibition has just been opened in Springfield, Mass., in connection with the work of the Vocational School. All of the large companies of the city are represented by their products, some of them by partly completed products.

The Frost & Walls Machine Co., Vineland, N. J., will distribute a bonus of 10 per cent next March.

Days of Old

Recalled by Carnegie's "Boys" at Home of Chas. M. Schwab.

Mill days, with their trials of hard work and sacrifice, and their joys of accomplishment and progress, were lived anew in reminescence and story by the Carnegie "old boys" at the residence of Chas. M. Schwab, on Riverside drive, New York City, Friday evening, Jan. 21. It was the occasion of the fourteenth annual gathering of the Carnegie Veterans' Association, the men to whom Andrew Carnegie gave the opportunity to rise from the ranks and who took it. There was one thing lacking, however, to make the affair complete with its accustomed gaiety and good-fellowship. That was the presence of Andrew Carnegie. It was the first time the iron master had missed the annual reunion with "his boys". He sent a message of hearty cheer and greeting from Miami, Fla., where he is spending the winter, and promised to be on hand next year. Business discussions were tabooed at the dinner. It was simply "Charlie" and "Bill", "John" and "Jim", "Joe" and "George" and things personal that counted.

The usual slate of officers went through. It is President, Andrew Carnegie; vice president, C. M. Schwab; secretary and treasurer, Chas. L. Taylor.

Among those who attended the dinner were:

Charles W. Baker, W. R. Balsinger, W. W. Blackburn, H. P. Bope, Albert C. Case, William Ellis Corey, William B. Dickson, Thomas Morrison, W. C. McCausland, John McLead, Gibson D. Packer, James Gayley, Joseph E. Schwab, A. R. Peacock, H. E. Tener, E. H. Utley, Charles L. Taylor, William L. Abbott, D. G. Kerr, D. M. Clemson, James Scott, William P. Palmer, Robert A. Franks, E. S. Mills, George E. McCague, J. J. Campbell, Alva C. Dinkey, Aza R. Hunt and Homer D. Williams.

Some of the "veterans" were not able to take in the night's festivities. These were H. C. Phipps, George Lauder, A. Monell, E. Swenson, George H. Wightman, James H. Reed, John C. Fleming, E. T. Wood, P. T. Berg, Millard Munsiker, John G. A. Leishman and J. Potter.

Iron and Money: Fact and Comment

Bears Get Busy After Declaration of Dividend on Bethlehem Steel Co.'s Common Stock—Dull Week on Wall Street

STOCKS declining as the result of a declaration of a dividend of 30 per cent by a stock which never had paid a dollar in dividends! That seems like a remarkable proposition, but it is exactly what occurred last week when Bethlehem Steel common, by the action of the directors at New York, Jan. 20, was placed on a lucrative dividend basis by the declaration of a distribution of 30 per cent out of 1915 earnings to be paid in quarterly installments. It having been currently reported that Bethlehem had been earning 100 per cent on common, Wall street professed to be disappointed by the declaration of a 30 per cent dividend.

Previous to the action on Thursday in regard to the Bethlehem dividend, the stock market had been in a rather lethargic condition. Monday there was a decided lack of public interest and news from across the water, including the announcement of Montenegro's surrender, had a depressing effect.

Tuesday there was very little of interest on the stock exchange and quotations manifested a disposition to slip. Trade was mainly professional.

A feeling of uncertainty prevailed Wednesday, but the bond market held up well, in view of the weakness in stocks. Bethlehem Steel resisted the efforts of the bears.

The proceedings Thursday were tame until the announcement that the Bethlehem dividend was declared; then the hammering of values was started and losses became general. Bethlehem lost 6 points during the day, with trading light.

Trade was more moderate Friday, but a number of advances were recorded. United States Steel showed a slight advance.

There were no decided changes Saturday and the market closed showing losses for the week by not only Bethlehem, but United States Steel, Republic Iron & Steel, and other prominent stocks.

Quotations at the close of business Jan. 22 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

	Close Jan. 22.	Net change.
American Can	63	— ¼
American Can, prfd	112½	— ⅛
Amer. Car & Fdy	68½	—2½
American Locomotive	64½	—2
American Locomotive, prfd.	101½	.....
American Steel Foundries	57⅜	— ⅛
Baldwin Locomotive	109⅜	—2⅝
Baldwin Locomotive, prfd.	108½	+ ½
Bethlehem Steel	472	—6
Bethlehem Steel, prfd.	140	—1
Colorado Fuel & Iron	46½	—2½
Continental Can	79⅞	—4⅜
Crucible Steel	66½	—1½
Crucible Steel, prfd.	110	— ⅝
General Electric	173¼	—2¾
International Harv. of N. J.	111	+ ¼
Inter. Harv. of N. J., prfd.	116	—3½
Internat'l Harv. Corp.	74	—4
Lackawanna Steel	80	—2¾
Nat'l Enamel'g & Stamp. Co.	27½	— ¼
Nat'l En. & Stp. Co., prfd.	92	.....
Pressed Steel Car	58½	—2½
Pressed Steel Car, prfd.	104	— ⅜
Pullman Palace Car	167	—1
Republic Iron & Steel	51	—1½
Republic Iron & Steel, prfd.	108	— ¾
U. S. Cast Iron Pipe & Fdy.	21¼	—1
U. S. C. I. P. & Fdy, prfd.	50	.....
United States Steel	84⅛	—1⅞
United States Steel, prfd.	117¾	— ⅛
Westinghouse Mfg.	68	+ ¾

The following table shows changes in maximum quotations of stocks not listed on the New York stock exchange:

	High Jan. 21.	High Jan. 14.
American Radiator	393	390
American Ship Building	36¼	35
Cambria Steel	75⅜	75½
Chicago Pneumatic Tool	75	76½
LaBelle Iron Works	....	52½
Lake Superior Corpn.	9⅜	9½
Pennsylvania Steel, prfd.	81½	83
Stewart-Warner Speed. Co.	90¾	90¾
Warwick Iron & Steel Co.	10¼	10⅜
Westinghouse Air Brake	139	139
Westingh'se Elec. & Mfg. Co.	68½	68½

Pipe Dividend

Directors of the United States Cast Iron Pipe & Foundry Co. last week declared a dividend of 2 per cent on the preferred stock out of earnings for the last seven months of 1915. This is the first disbursement on that stock since April, 1914, when dividends were suspended.

Owns Nearly All

Hartford, Ct., Jan. 25.—According to an organization certificate filed with the Secretary of State, Marcellus Hartley Dodge of Passaic, N. J., head of the two Remington companies to be absorbed in New York and Connecticut, holds all but 60 shares of the stock of the $60,000,000 Remington Arms-Union Metallic Cartridge Co. of Bridgeport, recently incorporated.

Sixty shares of the 600,000 common stock are distributed among James L. Banks Jr., Reginald Roome, Chauncey B. Garver, George Bingham, Henry Hoffman, Frederick W. Jackson and C. L. Reierson all of 55 Wall street or 233 Broadway, New York.

Mr. Dodge, with his 599,940 shares of common and all the 400,000 shares of preferred, has been elected president.

In addition to the shareholders mentioned the directors are Samuel F. Pryor and William F. Lawrence of Bridgeport.

American Brake Gains

The American Brake Shoe & Foundry Co. reports net earnings of $1,180,613, after deducting manufacturing, administrative and selling expenses and depreciation and including income and earnings of subsidiary companies. After interest payment, the surplus was $1,145,387. After payment of 7 per cent dividends on the $4,600,000 common stock—to which dividend return the common is limited—the balance, $823,387, was equivalent to 16.64 per cent on the $5,000,000 preferred stock outstanding as compared with 14.03 per cent the previous year. The income account compares as follows:

	1915.	1914.
Earnings	$1,180,613	$1,059,745
Interest	35,226	36,172
Surplus	1,145,387	1,023,572
Dividends	322,000	322,000
Surplus	823,387	801,572

The balance sheet of the American Brake Shoe & Foundry Co. as of Sept. 30, 1915, compares as follows:

ASSETS.

	1915.	1914.
Plants, patents, etc.	$8,246,229	$8,206,338
Investments	3,514,802	3,444,165
Cash	964,645	714,005
Accts. and bills receiv.	1,461,671	1,566,951
Marketable loans, etc.	997,480	770,381
Inventory	936,719	981,756
Mfctd. stock	408,815	491,415
Total	$16,530,361	$16,175,011

LIABILITIES.

Preferred stock	$5,000,000	$5,000,000
Common stock	4,600,000	4,600,000
First mortgage bonds	691,000	710,000
Reserve funds	1,128,750	1,087,914
Accounts payable	381,426	471,221
Accrued bond interest	2,879	2,958
Surplus	4,726,306	4,302,918
Total	$16,530,361	$16,175,011

Creditors' Committee

The creditors' committee, selected by the Fayette county bar association, to straighten out the entangled financial affairs of Josiah V. Thompson, Uniontown banker and coal land owner, met Jan. 20 at Pittsburgh. Members of the committee are: James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown; A. Plumer Austin, president of the Fayette Title & Trust Co., Union-

town; Alexander C. Robinson, president of the Safe Deposit & Trust Co., Pittsburgh; A. R. Hamilton, director of the Commonwealth Trust Co., Pittsburgh; A. F. Cooper, attorney, Uniontown; E. F. Hitchman, president of the Hitchman Coal & Coke Co., Wheeling, W. Va., and G. S. Harah, director of the Second National Bank of Uniontown.

Alex. C. Robinson was elected chairman and A. F. Cooper, of Uniontown, was elected secretary of the committee. The liquidation will be financed by Samuel Huntermyer, corporation attorney and financier, of New York.

Satisfactory Report

In a special notice to stockholders, George M. Verity, president of the American Rolling Mill Co., Middletown, O., recently said that the earnings of the company for the six months ending Dec. 31, last, were ample to cover all fixed charges and dividends for the entire fiscal year. Earnings for the first six months of this year will go into a surplus applicable to the payment of outstanding gold notes.

A special stock dividend of 5 per cent has been declared, payable Feb. 10, to all stockholders of record Jan. 20. The stock dividend is the first installment against the 25 per cent of stock authorized for stock dividend purposes. The present outstanding capital stock of the company is $6,400,000 and the amount unissued is $1,600,000.

Mr. Verity states that "The company's three plants are operating at maximum capacity, with orders booked ahead, covering full operations of the mills for many months at very satisfactory prices."

Handsome Gain

The American Locomotive Co. issued a statement of earnings last week for the first six months of its fiscal year, following the plan of the directors of making public the progress of business more frequently than in the annual statement alone. The report showed gross income of $14,398,859 in the six months ended Dec. 31, 1915, a gain of $9,039,630 over the same period of 1914. Expenses amounting to $11,442,452 were $5,592,455 greater, and the surplus, after interest and preferred stock dividends, was $3,508,584 larger than in the first half of the preceding year. In scoring this gain in surplus the company had to overcome a deficit of $1,555,844 suffered a year before.

Chairman S. L. Schoonmaker reported unfilled orders on the books on Dec. 31 amounting to $52,240,000. In part this represented contracts for shells for the allied governments, but the locomotive business supplied a substantial amount of the whole.

Stock Dividend

Stockholders of the National Acme Mfg. Co., Cleveland, have approved increase in the capital stock from $2,500,000 to $9,000,000. Of the new, $1,500,000 6 per cent cumulative preferred has been sold to the Cleveland Trust Co. and redistributed by it to investors. There will remain $5,000,000 common stock in the treasury and President W. D. B. Alexander told shareholders last week that a stock dividend is in prospect. This will be 100 per cent or in that neighborhood. The company has financed purchase of the Windsor Machine Co. of Windsor, Vt., and projected extension of its Cleveland plant out of assets it already had on hand and the sale of the preferred. The present dividend rate on common is 6 per cent, payable bimonthly.

Directors of the National Screw & Tack Co., of which also Mr. Alexander is president, declared a stock dividend of 16 2/3 per cent on common, thus increasing outstanding common to $1,750,000. The company on several previous occasions has disbursed stock dividend.

Financial Notes

Earnings of the American Rolling Mill Co., Middletown, O., which recently declared a special stock dividend of 5 per cent, payable Feb. 10, were large enough in the last six months of 1915 to cover all fixed charges, regular and special depreciation and regular dividends for the entire fiscal year. Earnings of the first six months will go into a surplus applicable to the payment of outstanding gold notes and for such other purposes as directors of the company may decide.

The Pittsburgh Steel Co. reports for the first five months ended Nov. 30, 1915, gross earnings of $7,859,316, compared with $3,655,405 the corresponding period in 1914, an increase of $4,203,911. Net earnings, after expenses, including repairs and maintenance of plants and depreciation were $1,447,926, as compared with $235,893 the previous year. The surplus available for dividends was $1,335,288, as compared with $147,660, an increase of $1,187,628.

A. M. Castle & Co., iron and steel warehouse, Chicago, have occupied an addition 60 x 250 feet, steel construction, with traveling cranes and other warehouse equipment.

Will Establish Nickel Refining

Toronto, Jan. 24. — The question of establishing the nickel refining industry in Canada has been for some time under consideration by the Canadian government, and it is now announced that a definite conclusion in favor of the proposal has been reached. Last year an embargo on the output of nickel matte and ore was strongly urged as a war measure in order to prevent any of the refined metal finding its way to the Germans. It was then felt that the undertaking of establishing a Canadian refinery would not be commercially feasible, owing to the fact that the principal market for nickel was in the United States, and that the increased cost of raw material, combined with the American duty on the output, would render the enterprise unprofitable. The demands of the allies for nickel for war purposes at high prices have materially altered conditions and practically assured a steady renumerative market for all the nickel that can be purchased. It is understood that negotiations between the government and the International Nickel Co., which now refines most of the Sudbury matte at Bayonne, N. J., have been almost completed, and an arrangement effected under which the company will establish a refining plant on the Atlantic seaboard, probably in Cape Breton, at which operations will be conducted under the control of the Canadian government.

Cable Merger

A merger of insulated wire and cable manufacturing plants to be known as the Habirshaw Electric Cable Co., with offices at New York, Yonkers, N. Y., and Bridgeport, Conn., has been worked out. This will embrace the Habirshaw Wire Co., Yonkers; the Electric Cable Co., Bridgeport; and the Waterbury Co. Brooklyn. The officers are Edwin W. Moore, president; Robert S. Satterlee, vice president; J. Nelson Shreve treasurer, and Granville F. Waterbury, secretary. It is proposed to enlarge the plant of the Habirshaw Wire Co. and to equip it for the manufacture of paper insulated cables for the submarine and lead-covered cable market. Code telephone wires and high voltage cables will be manufactured at the plant of the Electric Cable Co. at Bridgeport, as heretofore. The new company is about to take out papers of incorporation.

Domestic Inquiry Suffers Set Back

Foreign Buying Slow With Russia Still in Market—Pittsburgh Demand Fair While Chicago Market Improves—Cincinnati Strike Settled

THE DEMAND for machinery is less active than a week or two ago, due to a further falling off of export requirements. While Russia continues to be the heaviest foreign buyer, the volume of business from that source is steadily tapering off; the demand from other countries also is smaller. Buying by the munition manufacturers continues to be brisk, but there have been no further transactions of special importance. Domestic inquiry, according to reports by the trade generally, shows little change from the past few weeks. There are few important transactions, although there is a good volume of demand from practically all lines of industry. Demand from the ship building companies is especially good. The heaviest purchaser of this character is the Newport News Ship Building & Dry Dock Co., Newport News, Va., which last week placed orders for about $75,000 worth of equipment. The Samuel L. Moore & Sons Corporation continues to figure actively on equipment for the new ship building plant at Elizabethport, N. J. The eastern railroads have not figured as important buyers of machine tools during the week. Demand for cranes is less active. The biggest inquiry before the trade is that mentioned in last weeks issue of *The Iron Trade Review,* involving a number of heavy cranes for a steel plant in Russia.

Among concerns in the east, which are expanding their capacity, are: The Billings & Spencer Co., Hartford, Conn.; Percival Smith Co., Poughkeepsie, N. Y.; Bullard Machine Tool Co., Bridgeport, Conn.; Gould & Eberhardt, Newark, N. J.; Norma Co. of America, New York; S. K. F. Ball Bearing Co., Hartford, Conn.; Mysto Mfg. Co., New Haven, Conn.; Air Reduction Co., Philadelphia, and Connecticut Alloyed Metals Co., Bridgeport, Conn.

Domestic Demand in Chicago Increases

Although machine tool dealers in Chicago find that the demand for export sales is somewhat less and is settling to a steady trade, domestic requirements are increasing. Inquiries are being received from machine tool users for almost every purpose and indications are that almost every line is in need of further equipment. One effect of the inquiry for export machinery during last year is that the greater portion of second-hand tools has been picked up and shipped out of the country at fancy prices. An instance of this action came up within the past week, when a boring mill was sold for more than the seller will be required to pay for a new machine of the same capacity. The fact that the buyer wanted the tool immediately, while the seller was in a position to wait for delivery from the manufacturer, made this arrangement possible. Automobile builders and machine tool makers are buying considerable equipment to keep up with the demand for their output. It is understood a number of railroads are preparing their annual appropriations, which will include considerable machine shop equipment and these are expected to come before the trade during the next 60 days. An inquiry for about 60 machines for shipment to England has just appeared, including lathes, grinders and milling machines. Charles Stecher & Co., 108 North Jefferson street, Chicago, have bought the plant of the Fort Dearborn Mfg. Co., 1574 Crossing street, Chicago, and will move their business to that place shortly. This company manufactures wire forming machinery and recently has taken up the manufacture of a 1-inch screw machine, on which it is sold up for several months. Smerr & Kamen, 313 North Whipple street, Chicago, has taken an order for 200 screw machines to handle 1⅝-inch stock.

Pittsburgh Activity Slackens

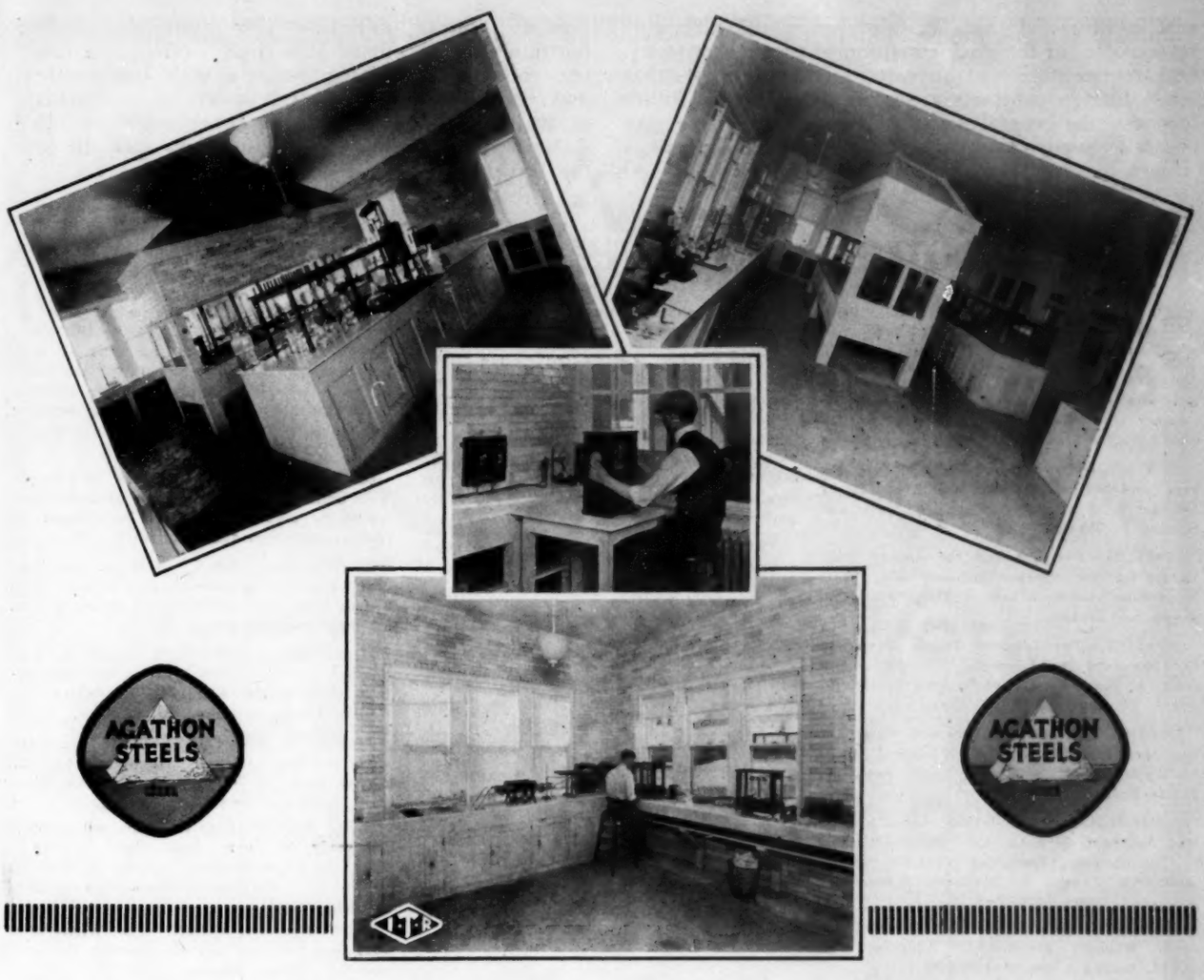
Pittsburgh machine tool dealers, for the first time in many months, are experiencing a temporary lull in buying. This is attributed to the taking of inventories and to the falling off in demand for machinery for the manufacture of war material in the immediate Pittsburgh district. The Westinghouse Electric & Mfg. Co., which has been a prominent buyer of lathes the last 12 months, is not buying any equipment at the present time. The General Electric Co. has just closed for 10 lathes for its plant at Erie, Pa. The Carnegie Steel Co. has awarded a contract to the Alliance Machine Co., Alliance, O., for a 60-ton crane for installation in the Homestead steel works at Munhall, Pa. The Wickwire Steel Co., Buffalo, and a manufacturer in the Wheeling district, has opened negotiations for a number of electric traveling cranes. Manufacturers of heavy rolling mill equipment are operating plants at maximum capacity and are unable to promise deliveries in less than four or five months.

Cincinnati Conditions Again Normal

Machine tool plants in and around Cincinnati are running without interruption for the first time since the third quarter of 1915. The strike of union machinists at Hamilton, O., has been settled, and employers have evidently won the labor dispute in Cincinnati, where shops are now working at capacity. Statistics show that the first half of January was far ahead of any similar period during the last quarter of last year in the number of workmen employed and machines shipped. Demand from domestic and foreign sources continues heavy, but the larger shops are not interested, as they have contracts that will keep them running during all of 1916. Smaller machine tool makers are showing a decided tendency to take domestic orders in preference to those for foreign delivery.

Cleveland Business Slow

The machine tool market in Cleveland is quiet. There are no contracts of any particular note pending and while the demand from domestic users is steady, business has suffered a slight decrease. Foreign buying is dropping off and while there is a good demand from Canadian sources, it is largely for second-hand tools. Local dealers report a further delay in shipments on some tools, this being especially true of heavy-duty lathes and machines used for munition-making. In a few cases 1917 delivery is quoted. The congestion of the railroads in the



"Agathon" Quality a Certainty

Back of "Agathon" Quality stands our laboratory with the chief chemist and metallurgist watching over every detail of manufacture.

The Central Steel Company has spent millions for better steel, including unstinted thousands for laboratory equipment, thus making it possible to continually and surely guard the quality of "AGATHON" Products.

The illustrations show characteristic views of our chemical and physical laboratories.

AGATHON STEELS

"AGATHON" Chrome Nickel	"AGATHON" Special Analyses
"AGATHON" Chrome Steel	"AGATHON" Vanadium
"AGATHON" Chrome Vanadium	"AGATHON" Silico-Manganese
"AGATHON" Nickel Steel	"AGATHON" High Carbon

THE CENTRAL STEEL COMPANY

MASSILLON, OHIO

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, District Representative
Cleveland Office: Hickox Bldg. - The Hamill-Hickox Co., District Representative

east is being felt to a certain degree and is largely responsible for the slack condition of the market today. One representative of an eastern builder reports that while foreign contracts are being accepted for future business, the general policy of that concern is to give domestic inquiries first attention. Another dealer has received several inquiries from neutral powers with regard to future business, stating that at the close of hostilities, there will be little likelihood of the countries now at war doing business with one another, making it difficult for neutral powers to discriminate in their purchases. Effort is being made to place American machines in these countries to open the way for future markets.

Among New England Factories

BOSTON.—P. C. Larken will build a brick and steel fireproof 8-story, 70 x 100-foot warehouse at Berkeley and Stuart streets.

BOSTON.—Bids have closed for a brick and stone fireproof 3-story, 63 x 127-foot elementary school for the city in Dorchester district.

BOSTON.—The Standard Smelting Co. has been incorporated; $25,000 capital stock; by George M. J. Bates, William B. Nash and Edward E. Dunbar.

BOSTON.—Fire damaged the 4-story brick factory of the Sprague-Hathaway Co., West Somerville, causing a loss of $150,000 and injuring ten firemen.

BOSTON.—The Campbell Textile Machinery Co. has been incorporated; $200,000 capital stock; by Leon W. Campbell, Fred L. Hewitt, and J. W. Robbins.

BROOKLINE, MASS.—The Mills Mfg. Co. has been incorporated; $25,000 capital stock; by Wesley M. Mills, Samuel Smyth and John J. Marshall.

CAMBRIDGE, MASS.—The "Novak" Acetylene Apparatus Mfg. Co. has been incorporated to manufacture specialties; $25,000 capital stock; by Edward E. McGauty, Edward T. Ryan and others.

CHICOPEE, MASS. — Fire of unknown origin seriously damaged the Chicopee high school, causing a loss of $250,000.

INDIAN ORCHARD, MASS.—The Fiberloid Co. has been issued a permit for erecting a 2-story, 142 x 165-foot manufacturing and storage building to cost about $90,000.

MERRIMAC, MASS.—The G. W. J. Murphy Co., maker of brass auto specialties will remove to Amesbury and occupy a factory building on Carriage hill, where 200 hands will be employed.

MILLBURY, MASS.—The Stoddard Rubber Co. plans to add 100 feet to its present 1-story building and install about $10,000 worth of machinery of the latest type.

NEW BEDFORD, MASS.—The Manomet Mills has increased its capital stock by $1,000,000 and will erect a new mill.

NEW BEDFORD, MASS. — Contract has been awarded by the Sharp Mfg. Co., for a brick, 4-story, 134 x 575-foot mill, an office building, two stories, 50 x 110 feet and a storehouse four stories, 70 x 200 feet to its plant on Rockdale avenue, to cost $350,000.

WORCESTER, MASS.—The Norton Co. has just completed and put in operation a new grinding wheel plant that will give employment to 200 additional hands. The buildings comprise a brick and steel, 4-story, 60 x 176 foot main factory, a brick 2-story, 80 x 352-foot kiln building in which is housed a battery of 13 kilns and a 38 x 352-foot coal pocket.

PROVIDENCE, R. I.—The city will build a brick, 2-story grammar school to contain 18 rooms and hall to cost $150,000.

PROVIDENCE, R. I.—The American Locomotive Co., will erect four 1-story storage buildings on Hendrick and Valley streets.

PROVIDENCE, R. I.—The Texas Oil Co., will erect 11 steel tanks, varying in diameter from 9 to 52 feet and two steel and concrete sheds two stories, 22 x 51 feet and 30 x 86 feet.

PROVIDENCE, R. I.—The Crawford Mfg. Co., has been incorporated to make an electric water heater; $100,000 capital stock; by Edward M. Sullivan and John J. Sullivan, both of Cranston and Bartholomew J. Hart, Providence.

BANTAM, CONN. — The Trumbull-Vanderpool Electric Mfg. Co., Inc., has increased its capital stock by $22,200 making the total $92,000.

BEACON FALLS, CONN. — The Beacon Falls Rubber Shoe Co., will build brick and steel 2-story addition to its plant at Beacon Falls.

BRIDGEPORT, CONN.—The Bullard Machine Tool Co. has let a contract for the erection of a 50 x 268-foot machine shop.

BRIDGEPORT, CONN. — The Bridgeport Brass Co. has awarded a contract for a brick and steel 1 and 2-story, 100 x 150-foot extension to its tube mill to cost $36,000.

BRIDGEPORT, CONN.—The R. E. Parsons Co,. Bridgeport, Conn., which recently increased its capital stock, will build a new foundry, 150 x 300 feet, at the corner of North Washington avenue and Frederick street, Bridgeport, where a large tract of land has been secured. Its present foundry located at Barnum, Hallett and Helen streets, will be dismantled and the whole block probably will soon be demolished to make way for buildings for the Remington Arms-Union Metallic Cartridge Co. R. E. Parsons has resigned from the company. The directors of the new company are John W. Cottrell, president, Clarence A. Bilton, of the Standard Mfg. Co., secretary and treasurer and Frederick Rhodes, secretary of the Salt's Textile Co.

HAMDEN, CONN.—The town of Hamden is to build a brick, 2-story and basement high school to cost $125,000 and to contain 18 rooms, auditorium and gymnasium.

HARTFORD, CONN. — Work has been commenced on the erection of a 2-story, 50 x 97-foot forge shop at Park and Laurel streets, for the Billings & Spencer Co.

HARTFORD, CONN.—The S. K. F. Ball Bearing Co. has started work on the construction of a 1 and 2-story, 180 x 209-foot ball bearing factory to cost about $150,000.

MIDDLETOWN, CONN.—The F. L. Caulkins Auto Co. has been incorporated; $100,000 capital stock; by Frederick L. Caulkins, Theodore G. Sprague and Marguerite M. Matthews.

NEW HAVEN, CONN.—Plans will probably be ready to figure about April 1, for a brick and stone fireproof 10-story building on Court street for the Southern New England Telephone Co.

NEW HAVEN, CONN.—The Mysto Mfg. Co., toys and novelties, is planning the erection of a large addition to its plant in the Cedar hill district. It also will transfer its Foote street plant to the Celar hill location.

RIDGEFIELD, CONN.—The J. M. Hibbard Co., Inc., has been incorporated to do a general contracting and constructing business; $50,000 capital stock; by David S. Day, William Webb and Philo C. Calhoun.

WALLINGFORD, CONN. — The town of Wallingford will build a high school to cost $107,000 at South Main and Prince streets.

WATERBURY, CONN.—Work has been started on the erection of two factory buildings, one-story, 39 x 90 feet and two stories, 50 x 126 feet, respectively, for the Waterbury Mfg. Co.

WETHERSFIELD, CONN. — The Connecticut Institute for the Blind has awarded contract for a brick and stone fireproof 1 and 3-story and basement, 40 x 184-foot administration building and work shop.

Along the Middle Atlantic Seaboard

BUFFALO.—J. H. Williams & Co. manufacturers of forgings, have awarded the John W. Ferguson Co., New York and Paterson, N. J., a contract for several additions to the plant. The drop hammer shop addition will be the largest giving additional space 34 x 310 feet. Stock and finishing building will be 80 x 82 feet and a repair shop one story, 62 x 98 feet, will be among the other improvements.

LEWISTON, N. Y.—The Niagara Smelting Corporation has been incorporated to do a general smelting business; $250,000 capital stock; by E. M. Nauth, F. F. Baker and R. A. Kellogg, 536 Ellicott square, Buffalo.

NEW YORK. — The plant of the Jas. J. Bogue Electric Co., at 513 West Twenty-ninth street, was damaged by fire.

NEW YORK.—The Norma Co. of America, 1790 Broadway, has just commissioned Francisco & Jacobus, architects and engineers, 200 Fifth avenue, to draw plans for a ball-bearing factory, to be erected at a cost of about $300,000.

POUGHKEEPSIE, N. Y.—The Percival Smith Co., Grant Smith, president, has let a contract for the erection of three 2-story factory buildings to cost approximately $100,000. The company will manufacture automobile accessories.

ROCHESTER, N. Y.—The Bauch & Lomb Optical Co. has applied for permission to erect a 1-story addition, 133 x 222 feet, to take the

DEAN-ITASCA ORE

THE DEAN-ITASCA MINE is on the Mesabi Range. The ore is non-bessemer, of good coarse structure. Shipments for 1915 were 486,374 tons, mostly since August 1. For 1916 they will be considerably greater.

A complete analysis of Lambert Ore from Dean-Itasca Mine in natural state and dried at 212° Fahr.

	Dried 212°	Natural
Iron	58.40	50.2882
Phosphorus	.064	.0551
Silica	6.03	5.1924
Manganese	.56	.4822
Alumina	3.17	2.7296
Lime	.24	.2066
Magnesia	.21	.1808
Sulphur	.004	.0034
Volatile Matter	5.97	5.1407
Moisture	13.89	

Lambert Ore Guarantee for 1916, 51.50 Per Cent Iron, Natural

The output of this mine during 1916, together with our five other mines, gives us an unusually large tonnage.

We are now taking contracts for this ore and will be glad to figure on your requirements for the coming season.

THE TOD-STAMBAUGH COMPANY

Perry-Payne Building

CLEVELAND :: :: :: :: OHIO

place of the structure damaged by fire recently.

ALTOONA, PA.—The Dougherty Coal Co. has been incorporated; $5,000 capital stock; by Gerome B. Mann, Leroy Hammersley and Frederick G. Clemson.

ARDMORE, PA.—Sterns & Castor, Philadelphia, previously mentioned, have completed plans for a 3-story, 275 x 300-foot addition to the plant of the Autocar Co., Ardmore.

BARNESBORO, PA.—The Binder Coal Mining Co. has been incorporated; $10,000 capital stock; by E. M. Binder, president, James E. Green, general manager, and C. C. Adams, secretary and treasurer.

MAUCH CHUNK, PA.—The plant of Mauch Chunk Foundry & Iron Works, mining machinery, was damaged by fire, the loss being given as approximately $50,000.

MONTGOMERY, PA. — The Montgomery Table Works is getting ready to erect a 4-story, 56 x 280-foot addition.

PHILADELPHIA.—The Nice Ball Bearing Co. has been incorporated; $250,000 capital stock; by S. W. Nice and others.

PHILADELPHIA. — A 2-story, 50 x 138-foot warehouse is being built at 1224 Callowhill street by the Freund-Seidenbach Co. to be occupied by the Crucible Steel Co. of America.

PHILADELPHIA.—Wm. Steele & Sons is preparing plans for a 1-story, 70 x 100-foot plant, to be erected at Germantown and Sedgley avenue for the Air Reduction Co.

PITTSBURGH.—Golden & Crick will build a 3-story reinforced concrete garage, completely equipped on Senate street in the Oakland district.

PITTSBURGH.—The board of education will erect the west end Sheridan high school on Chartiers avenue. The building will cost $230,000.

PITTSBURGH. — The building program of the Carnegie Institute of Technology for 1916 contemplates the construction of a $125,000 head house for the school of applied science and a similar amount for a field house and bridge to Morewood avenue.

PITTSBURGH.—P. A. McBride, vice president of the Pittsburgh Knife & Forge Co., has made the announcement that the company has purchased the adjacent plant of the Diamond Forging & Mfg. Co., maker of drop hammers. The drop hammer department will be used to make automobile and miscellaneous drop forgings.

PUNXSUTAWNEY, PA.—The Banks Coal Co. has been incorporated; $65,000 capital stock; directors are: George F. Fink, treasurer; H. G. and W. A. Bowers, W. F. Boyer and A. F. McCall.

PUNXSUTAWNEY, PA. — W. G. Cook, Pittsburgh, has purchased the sheet metal works at Punxsutawney, formerly owned by J. V. McClaskey. No improvements are contemplated at this time.

RANKIN, PA.—Fire damaged the office of the McClintic-Marshall Co. to the extent of about $1,000.

SHARON, PA.—Judge J. A. McLaughrey has approved the contract made by the county commissioners with the Canton Bridge Co., Canton, O., for the State street bridge, which will cost about $50,000. Drawings of the bridge have been sent to Harrisburg for the approval of the waterways commission.

WILKESBARRE, PA. — The Vinoppier Specialty Co. has been incorporated to manufacture metallic vaporizers; $10,000 capital stock; by N. A. Oppenheimer and others.

WILKINSBURG, PA.—Citizens have voted $250,000 in bonds for erecting a public school at Wallace avenue and Mill street.

WILLIAMSPORT, PA. — The Keystone Talking Machine Co. has let a contract for the erection of a 1-story, 67. x 200-foot factory building.

BELMAR, N. J. — The Strauss Bascule Bridge Co., Chicago, will erect a steel bridge across Shark river, to cost $42,000.

BLOOMFIELD, N. J.—The Peerless Tube Co., 79 Murray street, New York, has let a contract for the erection of a 2-story, 50 x 110-foot plant at Bloomfield, N. J.

CALIFON, N. J.—The Acme Chemical Co. has been incorporated to manufacture chemicals; $50,000 capital; by Edward B. Emery, Califon; Charles P. Cano, Phillipsburg; Thomas I. Smith, Morris Cohen, Thomas McRann, Keyport.

ELIZABETH, N. J.—The Ammo-Phos Corporation, which recently purchased considerable land in Linden township, will begin the erection of four buildings. Each will be 150 x 400 feet of steel and fireproof construction. Wharves and several smaller buildings will also be built.

ELIZABETH, N. J.—The Diehl Mfg. Co. has leased its plant on Newark avenue to Woodward & Co., Inc., and will sell its machinery, equipment and property to the same concern for $150,000. The Woodward company is a Delaware corporation and will manufacture munitions. The Woodward company will erect several buildings later.

GLOUCESTER, N. J.—Plans have been prepared for a 1-story, 45 x 122-foot machine shop to be erected here for the John M. Rogers Works, Inc.

NEWARK, N. J.—The Orange Mfg. Co. will spend $6,500 in making alterations to its plant on Emmet street.

BALTIMORE.—The Baltimore Engine Oil Co. has plans in progress for the erection of a 1-story, 100 x 150-foot factory building.

BALTIMORE, MD.—The Baltimore Tube Co. has announced that the capacity of the plant will be doubled by the installation of considerable equipment for the manufacture of seamless brass and copper tubing.

HAVRE DE GRACE, MD.—The American Metal Crosstie Co. has been incorporated to build a 15,000-spindle mill for manufacturing sea island cotton. The company has an authorized capital stock of $250,000.

Activities in the Central States

AKRON, O.—The Northern Ohio Traction & Light Co. will install two 20,000-horsepower turbo-generators, tripling the capacity of the power plant at the Gorge.

BELLEFONTAINE, O.—The Ironwood Mfg. Co. has been incorporated to manufacture and deal in agricultural implements of all kinds; $50,000 capital stock; by J. S. Kauffman, Frank L. Adams, C. E. Kagay, C. M. Baumgardner and J. S. Kagay.

CINCINNATI.—The contract for the plant of the Huenfeld Co., amounting to $150,000, has been let to D. Meinken, Cincinnati.

CINCINNATI.—The Alloy Products Co. has been incorporated to manufacture and deal in alloys and castings; $10,000 capital stock; by B. E. Moore, A. L. Quill, George W. Platt, D. McLaren and A. R. Bramble.

CINCINNATI. — The Nydia Bank Lock Co. has been incorporated; $50,000 capital stock; to manufacture mechanical devices, locks, and safety appliances; by E. M. Benham, Clinton Nash, W. E. Arnold, W. T. Benham, and E. H. Thiessing.

CLEVELAND.—The Acme Sheet Metal & Mfg. Co. has been incorporated; $10,000 capital stock; by E. P. Schlosser, M. L. Harrington, W. C. Kelley, E. H. Rooke and Joseph Hershey.

CLEVELAND. — The George B. McMillen Co., 1794 East Fifty-fifth street, has been awarded a contract for the construction of a factory addition to the plant of the Chisholm & Moore Mfg. Co., 5046 Lakeside avenue. Plans call for a 40 x 130-foot, 2-story structure to cost $10,000.

CLEVELAND.—The Victor Vacuum Cleaner Co. has increased its capital stock from $50,000 to $75,000.

CLEVELAND. — The Cleveland Lathe & Machinery Co. has been incorporated to build lathes and machines of all kinds; $25,000 capital stock; by Paul G. Mohler, Milton P. Mathews, John Swainson, James J. Brady and Louis A. Odam.

CLEVELAND.—The Loew Mfg. Co., Madison avenue and West Ninetieth street, previously mentioned as contemplating the erection of a plant addition, has had plans prepared for a factory addition on a site fronting 70 x 105 feet on West Eighty-ninth street.

CLEVELAND.—The Electric Purifying Machine Co. has been incorporated to deal in electrical, mechanical and chemical machinery; $10,000 capital stock; by Fred Decberg, J. M. Goldman, M. A. McCormick, S. I. Powell and C. S. Stevens.

CLEVELAND.—The Safety Service & Engineering Co. has been incorporated to conduct a general safety and efficiency engineering business; $10,000 capital stock; by Oscar MacNab, E. M. Abramson, W. R. Englehart, E. C. Konrad, Robb O. Bartholomew.

COLUMBIANA, O.—The Banner Machine Co. has increased its capital stock from $10,000 to $20,000.

DAYTON, O. — The American Mechanical Toy Co. has been incorporated; $150,000 capital stock; by F. A. Wagner, Francis W. Greene, R. R. Ballenger and W. P. Anderson.

DAYTON, O.—Four buildings will be added to the plant of the Recording & Commuting Machines Co., Essex avenue. One of these buildings will be 30 x 36 feet, of corrugated iron, one brick, 15 x 23 feet, the third will be a transformer house, brick, 15 x 30 feet, and the fourth a laboratory 24 x 26 feet.

DELAWARE, O.—The Sunray Stove Co. has purchased an acre and a half and will commence the erection of a modern factory building in the spring.

HAMILTON, O.—County Engineer Fred Hammerle will shortly receive the revised plans of the Columbia bridge from J. W. Mueller, consulting engineer, Richmond, Ind. After the plans have been approved bids will be asked. Bridge will be a reinforced concrete structure and cost about $125,000.

LORAIN, O.—C. W. Menz, George Hollstein and George Shivley, directors of the Amherst Lumber Co., announce that the capital stock will be increased from $30,000 to $40,000 for the purpose of purchasing additional machinery, erecting new buildings and making additions to the factory.

MARTINS FERRY, O.—The board of education will build a school building, to cost $100,000.

NEWTON FALLS, O.—The Newton Falls Construction Co. has been incorporated to manufacture and sell automobile jacks, pressure tanks, iron and steel products, etc.; $10,000 capital stock; by James L. McMann, George H. Dickson, L. R. Dickson, M. J. Dickson and Caroline E. McMann.

PORT CLINTON, O.—The Mathews Co. has been incorporated to build and deal in boats, engines and machinery; $820,000 capital stock; by S. J. Mathews, Willard Reid, M. C. Crosgray, F. H. DeWitt and George A. True.

TOLEDO, O. — The roundhouse of the Pere Marquette railroad was damaged by $65,000 fire.

TOLEDO, O.—The Toledo Speed Wrench & Tool Co. has been incorporated to manufacture wrenches, tools, etc.; $75,000 capital stock; by John W. Raab, C. D. Wilson, Jack S. O'Connell and Charles J. Alwood.

WARREN, O.—The Warren Tool & Forge Co. announces that at a recent meeting of directors that it was virtually decided to make considerable additions to the plant.

CHARLESTON, W. VA. — The Charleston-Dunbar Traction Co. plans to build a 20-mile extension.

CLARKSBURG, W. VA.—The National Coal Mining Co. has been incorporated to deal in coal and coal products; $50,000 capital stock; by C. B. Johnson, Clarksburg, C. R. Wilson, R. H. Knode and G. E. Beatty, Pittsburgh.

FAIRMONT, W. VA.—The Fairmont Hotel Co. plans to erect a 135 x 165-foot hotel, to cost about $225,000. George T. Watson is chairman of the building committee.

McWHORTER, W. VA. — The McCormick Coal Co. has been incorporated; $15,000 capital stock; by Donald McCormick, J. L. Kaufman, McWhorter, R. S. Douglass and L. C. Scott, Clarksburg, W. Va.

CLINTON, IND. — The Sullivan County Electric Co. has increased its capital stock to $150,000 and has announced that the increase was made to finance an increase in capacity whereby the company may be able to furnish electric light, heat and power to nearby cities and towns.

LEBANON, IND.—The Boone county commissioners have contracted with the Automatic Registering Machine Corporation, Jamestown, N. Y., for voting machines for use in the county. It is estimated that the contract involves about $12,000.

PETERSBURG, IND.—The Chicago & Eastern railroad will build a steel bridge across the east fork of the White river.

AURORA, ILL.—Love Bros., who operate the Aurora Foundry Co., will build an addition to their plant.

CHICAGO.—The building occupied by the Chicago Bronze Co. and the Hummel Light & Fixture Co. was damaged by fire to extent of about $100,000.

CHICAGO.—The Holdfast Nut Co., 344 South Hoyne avenue, has been incorporated; $250,000 capital stock; by Irving C. Woodward, Julius V. Isaacson and Stanley R. Woodward.

CHICAGO.—The Wilson & Bennett Mfg. Co., Fifty-eighth street and Sixty-fifth place, is in the market for steel barrel machinery to produce steel oil and gasoline tanks and barrels.

ROCKFORD, ILL.—The Modern Power Appliance Co. has been incorporated; $5,000 capital stock; by S. G. Smith, H. H. Rogers and William D. Knight.

DETROIT.—The Ross & Young Machine Co. has increased its capital stock from $35,000 to $750,000.

FLINT, MICH.—C. Brandt & Co., Flint, are having plans prepared for a 24 x 90-foot addition to their warehouse. The structure will be brick and fireproof.

HOLLAND, MICH. — The Cappon-Bertsch Leather Co. is having plans prepared for a 4-story addition to its present plant.

HOMER, MICH.—The Homer Furnace Co., previously mentioned, contemplates the erection of a foundry addition to cost $25,000.

MANISTEE, MICH.—The Michigan Light Co. has petitioned the state railroad commission to permit an issue of additional bonds to finance a gas plant in the city of Manistee.

PONTIAC, MICH.—The Grand Trunk railroad has announced that it will build three bridges over Orchard Lake avenue during the summer . U. E. Gillen, general superintendent, Chicago, has decided that the structures will be of concrete and cost about $20,000 each.

DE PERE, WIS.—The Western Steel & Iron Co., De Pere, has broken ground for a shop and warehouse addition. The general contract has been awarded to A. J. Beauregard of De Pere.

MILWAUKEE.—A steel plant now being operated in Iowa will remove to Milwaukee and locate on the land purchased by the Electric Steel Castings Co. The plant will manufacture specialties to be made from steel produced by the Electric Steel Co.

SHEBOYGAN, WIS.—The Winter Mfg. & Equipment Co. has been incorporated to manufacture steel filing cabinets, wardrobes, lockers and similar appliances; by E. A. Winter, R. H. Pfeifer and Arthur F. Winter.

WAUKESHA, WIS.—The Paramount Farm Tractor Co. is about to close a contract with the Federal Bridge Co. for the manufacture of 1,200 farm tractors for delivery this year. It is likely that the Federal machine shop will be considerably enlarged to handle the Paramount contract.

MONETT, MO.—The Ozark Power & Water Co. has announced that it will build a $40,000 sub-station.

ST. JOSEPH, MO.—The King Foundry Co. will add considerable equipment to its plant.

ST. LOUIS, MO.—The Busch-Sulzer Bros.-Diesel Engine Co. has announced that it will build a $40,000 addition to its plant.

ST. LOUIS, MO.—G. E. Scott, purchasing agent of the Missouri, Kansas & Texas railroad, is about to spend $90,000 for tools and shop equipment.

ST. LOUIS, MO.—The Fred Medart Mfg. Co. will erect a $40,000 plant at Second and Potomac streets for the manufacture of steel ladders. E. J. Medart is president of the company.

ST. LOUIS, MO.—The Liberty Foundry Co., 7600 Reilly avenue, will erect an 83 x 153-foot addition of mill construction. Bids have closed for the general construction and work will be started immediately.

ST. LOUIS, MO.—The Lister Sash Weight Co. has been incorporated to manufacture sash weights; $25,000 capital stock; by A. E. Poss, F. B. Hooper, L. E. McCommons, Laura L. Hooper, D. J. McCarthy.

ST. LOUIS, MO.—Benjamin F. Bush, receiver for the St. Louis, Iron Mountain & Southern railroad, was authorized by the United States district court to spend about $500,000 on equipment for the road. The improvements will be confined to the Missouri, White River, Arkansas, Valley, Louisiana and the Central divisions of the road.

W. A. Layman, president of the Wagner Electric Mfg. Co., St. Louis, has announced that work will be started within a month on a $55,000 addition to the company's plant at Plymouth avenue and the Wabash tracks. The addition will increase the area of the plant by 65,000 square feet. It will be two stories and five stories, the dimensions of the 2-story section will be 90 by 125 feet, and of the 5-story part, 90 by 100 feet. The company is using the old plant of the Mogul Truck Co. The company employs 2,000 people.

The Following Concerns Need Equipment. Can You Supply It?

Constant, Monette & Pion, 861 Ontario street, Montreal, Que., are in the market for equipment for the manufacture of potash. The new machinery will be installed in a chemical plant being erected by the city council at Three Rivers, Que.

The city of Hamilton, Ont., is in the market for mechanical rakes, a traveling hoist and a ½-cubic yard grab bucket and similar equipment for the Gage avenue pumping station. S. H. Kent is city clerk.

The Samuel L. Moore & Sons Corporation, Elizabethport, N. J., is still figuring actively on equipment requirements for installation at its new plant at Elizabethport.

The Russian buying commission is still in the market for cranes, as noted previously. The commission is located in the Flatiron building, New York City.

Wilson & Bennett Mfg. Co., Fifty-eighth street and Sixty-fifth place, Chicago, is in the market for machinery to manufacture steel barrels.

The White Star Coal Co., Pienville, Ky., is in the market for an electric hoist to operate a 2,500-foot incline with a 58 per cent maximum grade.

The MacFarlane, Pratt, Hanley Co., Port Robinson, Ont., is in the market for an 8 x 10-inch or 7 x 12-inch, double-drum hoist, each drum to be equipped with a ratchet and paul and brake straps with swinger attached. Boilers will also be purchased, each to withstand 100 pounds working pressure.

H. E. Ratz & Co., Millbank, Ont., is in the market for a 40 or 50-horsepower, Wheelock or corliss engine.

The Campbell Four Flour Mills Co., West Toronto, Ont., is in the market for a 2-phase, 60-cycle, 220-volt motor.

The Peterborough Metal Products Co., Peterborough, Ont., will take over the plant of the Canadian Cordage Co. and will install considerable equipment.

In the South and Around the Gulf

BASIC, VA. — The Price Electric Devices Corporation, Waynesboro, Va., has been incorporated to build lighting and ignition generators, starting motors, battery-charging outfits and switches; $100,000 capital stock; by W. G. Ellison, F. F. Freed, E. L. Eakle.

HAMPTON, VA. — An announcement has been made that James M. Cumming has purchased the plant of the Phoebus foundry on Chesapeake avenue and the C. & O. tracks, Phoebus, from George C. Thomas, Baltimore. It has been reported that the foundry will be opened after extensive alterations have been made. The plant is known as the Sayre Iron Works.

RICHMOND, VA.—The Richmond Forgings Corporation will build a machine shop to manufacture dies. Plans call for a 50 x 100-foot mill construction plant, contracts for which have been awarded to the Richmond Structural Steel Co., Richmond.

NASHVILLE, N. C.—A special election will be held Feb. 15 to vote on a bond issue of $10,000 to finance a municipal electric lighting system.

MACON, GA.—The Acme Brewing Co. will increase the capacity of its ice plant from 25 to 100 tons daily. Considerable equipment will be installed.

TAMPA, FLA.—Joseph Mizell has organized a company to erect a $25,000 brick building for cold storage and refrigerating purposes.

TAMPA, FLA. — The Tampa Foundry & Machine Works has been awarded a $200,000 contract for a 215-foot steel vessel for the Central Hudson Steamboat Co., New York.

MONTGOMERY, ALA. — The Alabama Chemical Co., recently incorporated for $225,000 will continue to operate a fertilizer plant which was acquired. W. B. Stratford, D. C. Allen, F. C. Battey and John H. Hunter are interested. The offices of the concern are in the Vandiver building.

CHATTANOOGA, TENN.—The Boaz Emergency Mfg. Co. has been incorporated to build heaters, stoves, patterns and to make castings of various kinds and has announced that a plant will be erected shortly. The plans call for one, 40 x 60, and two 80 x 200-foot buildings of concrete and steel. Considerable equipment will be installed, including cupolas, traveling cranes, foundry equipment and woodworking machinery. William B. Boaz is president and general manager, 2427 Central avenue, Hamilton, O.

MEMPHIS, TENN.—The Gillette Grain Co. has announced plans for the establishment of a grain elevator at Memphis at a cost of $40,000. The office of the company is in Nashville, Tenn.

NASHVILLE, TENN.—The Nashville Railway & Light Co. will build a sub-station in West Nashville, to be in operation in 90 days.

NASHVILLE, TENN.—The Tennessee Zinc Corporation has been incorporated; $10,000 capital stock; by R. B. Herzer and F. B. Shirley, Nashville, C. E. Hendrick, Harriman, Tenn., and others.

BARBOURVILLE, KY.—T. W. Minton & Co., who have a plant for the manufacture of vehicle stock, etc., will make handles and mining supplies in a new department which is now being equipped.

DANVILLE, KY. — The Danville Light, Power & Traction Co. has announced plans for substituting oil-burning equipment to replace present installation.

GLASGOW, KY. — The Glasgow Flooring Co. has bought the plant of the New Glasgow Planing Mill Co. and will install additional equipment.

KUTTAWA, KY.—The Kuttawa Milling Co. will equip an electric light and power plant before next September, and is now taking estimates. Address William Eades.

LOUISVILLE, KY.—The Louisville Gas & Electric Co. will increase the capacity of its power plant from 22,000 to 37,000 kilowatts. A large building will be erected, a tunnel constructed and a new stack erected. Donald McDonald is general manager.

OWENSBORO, KY.—The Glenmary Distillery will install equipment for the manufacture of alcohol. A separate plant will be equipped.

OWENSBORO, KY.—The Redicker Machine Co. has been formed with $50,000 capital stock by Charles Redicker and others for the manufacture of a gasoline engine. A plant will be equipped in the near future.

PIENVILLE, KY.—The White Star Coal Co. is in the market for an electric hoist to operate 2,500-foot incline, with a 58 per cent maximum grade.

TAYLORVILLE, KY.—The Crescent Lighting Co. will double the capacity of its plant in the immediate future.

NEW ORLEANS, LA.—The New Orleans Steel & Iron Co., 610 Audobon building, has been organized with $100,000 capital stock; by B. W. Seidel, Charles Bedell, W. L. Poer and D. J. Reilly. The company will build a rolling mill which will have a monthly capacity of 1,500 tons. Raw material will be scrap iron to be assembled in New Orleans.

CAMDEN, ARK. — Ouachita county commissioners have let a contract to Oats, Haynes, Taylor Co., Texarkana, Ark., for replacement of the main pier under the draw section of the Martin bridge over Ouachita river. The contract will amount to about $30,000.

GLENWOOD, ARK.—The A. L. Clark Lumber Co. is planning to build a railroad 18 miles north from Glenwood to its timber holdings.

RUSH, ARK.—R. M. Fletcher, Pine Bluff, Ark., and J. S. Howell, Pinnacle, Ark., have purchased zinc-bearing ore property in the Rush district and will proceed at once with the development of this land.

BEAUMONT, TEX.—The Texas Steel Co., tentative plans of which have been published previously, will be incorporated shortly with $2,500,000 capital stock; by S. G. Burnett, M. Guiterman, T. S. Redd Jr., John L. Keith and C. T. Heisig. Plans involve the development of 5,700 acres of ore-bearing land owned by L. P. Featherstone, Longview, Tex., the construction of a railroad to this property, the erection of furnaces and a steel plant, the capacity of the first unit to be 300 tons of pipe daily. Land has been voted by the common council of Beaumont for the plant and $1,500,000 has been subscribed. Deep water frontage has been provided and connections by inland waterway canal with the Mississippi river.

SULPHUR SPRINGS, TEX.—The Crystal Ice Co., which recently increased its capital stock from $25,000 to $35,000 has had plans prepared for a cold storage plant and has let the general contract to the Gilsonite Construction Co., St. Louis, Mo.

Up and Down the Pacific Coast

HOOD RIVER, ORE.—The Farmers Irrigation Co. will take up for consideration the construction of an electrical power plant on site controlled by the organization. It is estimated that the cost of the plant and dam will be $40,000. August Guidgnard is president of the company.

PORTLAND, ORE.—The Federal Machinery Co. has been incorporated; $5,000 capital stock; by Arnold E. Neate, Charles A. Coffey, Bernard O. Opitz and W. E. Crichtlow.

SALEM, ORE.—The Northwestern Steel Co. has been awarded a contract for furnishing the structural steel for the 2-story McGilchrist building under construction at Salem. The cost of the building will be about $25,000. George M. Post, Salem, is the architect.

NORTHPORT, WASH. — The Northport Smelting & Refining Co. is planning to install two zinc furnaces at its smelter at Northport.

NORTHPORT, WASH.—It is reported that the Chicago, Milwaukee & St. Paul railroad is planning the construction of a track from Coeur d'Alene, Ida., to Wallace, Ida. It also has a survey from Metaline, the terminus of its Idaho & Northern branch to Northport.

SEATTLE, WASH.—The Rex Metal Works has been organized by Max Finklestein and Alex K. Goldman. The company has been organized with $10,000 capital stock and plans are being prepared for the erection of a plant at once. The company will deal in babbitt metal.

SEATTLE, WASH. — The board of public works will receive bids until March 3 for the construction of the concrete and steel bridge across the Lake Washington canal at Tenth avenue northeast. Bridge will be of the bascule type. The substructure will cost $100,000 and the superstructure $200,000.

SEATTLE, WASH.—Active construction has been started on the ship building plant of the Skinner & Eddy Corporation, previously mentioned, Grant, Smith & Co. having the general contract. The first building to be erected will be a machine shop 70 x 250 feet, two stories, a wing 75 x 150 feet will be constructed to house the furnaces and forge plant.

SPOKANE, WASH.—The Spokane & British Columbia railroad has announced that it will start construction in the spring on the proposed connection between Republic and Spokane.

TACOMA, WASH.—It is announced that the American Smelting & Refining Co. will construct still another addition to the Tacoma smelter to cost $200,000. The addition will include a steel building to house two converter furnaces and other smelting equipment.

VALDEZ, ALASK.—Sealed proposals will be received at the office of the United States Engineer, Seattle, Wash., for the board of road commissioners for Alaska, with offices at Valdez, for one 300-foot steel highway bridge.

Western and Intermountain Territory

NORTH PLATTE, NEB.—Bids will be received until Feb. 15 by C. W. Yost, county clerk, for a bridge over the South Platte river, near Sutherland. Alternate bids are asked on two reinforced concrete bridges each with seven 36-foot spans and on two low-truss steel bridges each with three 85-foot spans, roadway 16 feet wide in each case.

PAPILLION, NEB.—Bids will be received until Feb. 10 by W. E. Patterson, county clerk, for a steel bridge over Elkhorn river with three 100-foot spans, 16-foot roadway.

SCHUYLER, NEB.—Bids will be received until Feb. 12 by Ed. F. Vrzak, county clerk, for a steel bridge over Platte river with four 175-foot, pin-connected, steel spans and creosoted wood block floor.

GREAT FALLS, MONT.—Material is being placed for the new Great Falls, Choteau-Agawam line of the Chicago, Milwaukee & St. Paul railroad. The proposed line is 70 miles in length and runs through Greenfield, Fairfield, Choteau and Farmington. Agawam will be made the terminus.

HELENA, MONT.—It is reported that the Great Northern railroad will construct the railroad from Lewistown to Fairview and on through North Dakota. It is reported that this work will start in the spring.

KINGSTON, MONT.—L. W. Johnson, St. Louis, will report favorably on the advisability of erecting a flour mill here. A power plant to develop 2,000 horsepower will be erected, and considerable mechanical equipment will be purchased.

LIBBY, MONT.—The Montana Silver Lead Mining Co. states that the company will construct a concentrator in the spring.

PRIEST RIVER, IDA.—The Illinois Steel Bridge Co., Terra Haute, Ind., has the contract for the construction of a bridge across the Pend O'Reille river at Priest River. The estimated cost of construction is $22,000. The bridge will have a 220-foot span.

CALGARY, ALTA.—Additions will be made to the power plant and new machinery to cost $22,500 will be installed. A. J. Graves is commissioner.

MEDICINE HAT, ALTA.—A large addition will be made in the near future to the power plant of the Lake of the Woods Milling Co. at Medicine Hat.

REDCLIFFE, ALTA.—New machinery will be installed in the factory of the Redcliffe Rolling Mills.

REDCLIFFE, ALTA.—The Dominion Glass Co. will build a 1-story addition to its plant at Redcliffe.

WINNIPEG, MAN.—The Manitoba Steel Foundries, Ltd., has been incorporated to manufacture machinery, iron, steel, tools, etc.; $100,000 capital stock; by P. J. Smith and others of Winnipeg.

WINNIPEG, MAN.—The Athabasca Power Co., Ltd., has been incorporated to build power plants and generate electricity, power, light, etc.; $100,000 capital stock; by Robert C. McPherson, Robert W. Killey, Edward W. Lowery, all of Winnipeg.

New Business in Eastern Canada

FREDERICTON, N. B.—The Fredericton Electric Co. will take over the plant of the Fredericton Gas Light Co. and will build an addition and install machinery in the plant.

GRIMSBY, ONT.—Bells, Ltd., has been incorporated to manufacture iron, steel and wood products, etc., $40,000 capital stock; by Thomas G. D. Bell, William F. Geddes, both of Grimsby, Ont.; and Elizabeth Gillies, of Hamilton, Ont.

HAMILTON, ONT.—The city engineer will purchase mechanical rakes, a traveling hoist, ½-cubic yard grab bucket, and appurtenances for the Gage avenue pumping station. S. H. Kent is the city clerk.

KILSYTHE, ONT.—The Derby Telephone Co., Ltd., has been incorporated to build and operate a telephone system; $10,000 capital stock; by John H. Moore, William Johnston, Stephens Donald, all of Derby, Ont.

MILLBANK, ONT.—H. E. Ratz & Co. will purchase a 40 to 50-horsepower Wheelock or corliss engine.

OWEN SOUND, ONT.—The Owen Sound Shoe Mfg. Co. has taken over the Pacific Hotel at Owen Sound and will remodel and install machinery for the manufacture of boots, shoes, etc. W. E. Wilson is interested.

OWEN SOUND, ONT.—A large addition will be built to the round house at Owen Sound, for the Grand Trunk railroad. T. W. Kaye, of Toronto, is purchasing agent.

OTTAWA, ONT.—The Ottawa Brass Mfg. Co., 367 Wellington street, Ottawa, will build an addition to its plant.

OTTAWA, ONT. — The Builders Sales, Ltd., has been incorporated to manufacture iron, steel, metals, rails, machinery, tools, etc.; $100,000 capital stock; by Frederick W. White, Edwin P. Nunn, Frederick D. Hogg all of Ottawa, Ont.

PETERBOROUGH, ONT. — The Peterborough Metal Products Co., will take over the plant of the Canadian Cordage Co., and will install machinery to manufacture its specialty.

PORT ROBINSON, ONT. — MacFarlane, Pratt, Hanley, Ltd., will purchase an 8 x 10 or 7 x 12-inch double-drum hoist, each drum equipped with ratchet and pawl and brake straps, with swinger attached and boiler to have working capacity of 100-pounds pressure.

SARNIA, ONT.—The Lockwood Green & Co., of Boston, Mass., are contemplating the erection of a factory in Ontario to manufacture cotton goods at a cost of about $500,000.

ST. THOMAS, ONT.—The Wabash railroad, St. Louis, Mo., has prepared plans for an addition to its roundhouse at St. Thomas, Ont., which will be started at an early date.

TECUMSEH, ONT.—The Eau Claire Water Works Co., Ltd., has been incorporated to build and operate a water works plant; $40,000 capital stock; by John A. Gouin, Malcolm S. Clapp, Adhelme Jacques and others of Sandwich East, Ont.

THOROLD, ONT.—The Ontario Paper Co., Ltd., will build a 30-ton sulphite mill at Thorold. Work will be started in a few weeks.

TORONTO, ONT.—The Campbell Four Flour Mills, Ltd., West Toronto will purchase a 2-phase, 60-cycle, 220-volt motor.

TORONTO, ONT.—The Norwalk Burial Vault Co., Toronto, has purchased a 3-acre site at West Toronto, Ont., near the Russell Motor Car Co. and will erect a plant.

TORONTO, ONT.—The Robert Simpson Co., Ltd., Yonge and Queen streets, will build an 11-story building on Mutual street to be of fireproof construction throughout and cost $500,000.

TORONTO, ONT.—The Credit River Works has been incorporated to manufacture electrical and mechanical goods and to build machinery of all kinds; $150,000 capital stock; by Walter G. Hammond, James D. McWilliams and Alexander McInnes, all of Toronto.

WARDSVILLE, ONT.—The county council is having plans prepared for a steel bridge to have a span of 85 feet to be erected at Wardsville. George E. Corneille is town clerk.

WESTPORT, ONT.—Fire did considerable damage to the plants of the Electric Light & Milling Co., of Westport.

MONTREAL, QUE.—The British Munitions Co., Ltd., has been incorporated to manufacture munitions; $50,000 capital stock; by Walter R. L. Shanks, Francis G. Bush and George Drennan, all of Montreal.

MONTREAL, QUE.—The Canadian Architectural Iron Works Co., Bellechasse street, was damaged by fire. Serious damage was done to machinery and tools.

MONTREAL, QUE.—The Inter-Ocean Automobile Co. has been incorporated to build automobiles; $50,000 capital stock; by Thomas B. Gould, Duncan McDonald and Laura M. Smith, all of Montreal.

MONTREAL, QUE. — The Automatic Sprinkler Co., of America, Ttd., has been incorporated to manufacture sprinklers, heating devices, fire protection apparatus, etc.; $10,000 capital stock; by Alexander Chase-Casgrain, John B. Henderson, Pierre F. Casgrain and others of Montreal.

MONTREAL, QUE.—The Canada Entertainment Co., Ltd., has been incorporated to manufacture machinery, motion picture machines, etc.; $100,000 capital stock; by Archibald J. Laurie, Isidore Greenburg, Joseph A. Dobrossky and others of Montreal.

MONTREAL, QUE.—J. O. Bourcier, Ltd., has been incorporated to build and operate mills for the manufacture of silk, fibres, cotton, etc.; $200,000 capital stock; by Errol M. McDougall, Charles M. Holt, John B. Henderson, all of Montreal and others.

MONTREAL, QUE.—The Laurin & Leitch Engineering & Construction Co., Ttd., has been incorporated to manufacture building material, munitions, and to build bridges, railways, public works, etc.; $100,000 capital stock; by Arthur R. W. Plimsoll, Arthur Vallee, Reigner Brodeur, all of Montreal.

THREE RIVERS, QUE.—The city council is building a chemical plant at Three Rivers which will be occupied by Constant, Monette & Pion, 861 Ontario street, Montreal, Que., who are in the market for new equipment for the manufacture of potash, etc.

THREE RIVERS, QUE.—The Nobert-Dugre-Arsenault, Ltd., has been incorporated to manufacture builders' and engineers' supplies, to build bridges, railways, power plants, etc.; $10,000 capital stock; by Francis X. Nobert, Alphonse Dugre, all of Three Rivers, Que., Albert Arsenault of Montreal, Que.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Deliver July 1.)

Bessemer, valley	$20.50 to 21.00
Bessemer, Pittsburgh	21.45 to 21.95
Basic, Pittsburgh	18.95 to 19.20
Basic, eastern Pa.	19.00 to 19.50
Basic, Buffalo	20.00
Malleable, Pittsburgh	19.95
Malleable foundry, Chicago	19.00
Malleable foundry, Philadelphia	20.50 to 20.75
Malleable foundry, Buffalo	18.00 to 19.00
No. 1X foundry, Philadelphia	20.50 to 20.75
No. 2 foundry, Pittsburgh	19.95
No. 2 foundry, Cleveland	19.30
No. 2 foundry, Ironton	18.00
No. 2 foundry, Chicago	18.50
No. 2X foundry, Philadelphia	19.75 to 20.50
No. 2X fdy., N. J. tidewater	19.75 to 20.50
No. 2X foundry, Buffalo	18.00 to 19.00
No. 2 plain, Philadelphia	19.25 to 19.75
No. 2 plain, N. J. tidewater	19.25 to 19.75
No. 2 plain, Buffalo	17.50 to 18.50
No. 2 southern, Birmingham	14.50 to 15.00
No. 2 southern, Cincinnati	17.40 to 17.90
No. 2 southern, Chicago	19.00 to 19.50
No. 2 southern, Phila. delivery	20.00 to 20.50
No. 2 southern, Cleveland	18.50 to 19.00
No. 2 southern, New York docks	18.50 to 19.00
No 2 southern, Boston docks	18.25 to 18.75
No. 2 south. interior, New Eng.	18.50 to 19.50
No. 2 southern, St. Louis	18.40 to 18.90
Virginia No. 2X furnace	18.00
Virginia 2X, Philadelphia	20.75
Virginia 2X, Jersey City	21.00
Virginia 2X, Boston points	21.25
Gray forge, eastern Pa.	18.50 to 19.00
Gray forge, Pittsburgh	19.45
Gray forge, Birmingham	14.00
Silveries, 8 per cent, Jackson, O.	25.00
Silveries, 8 per cent, Chicago	27.50 to 28.00
Low phos. Standard, Phila.	32.00
Low phos., Lebanon, Pa.	29.00 to 31.00
Low phos., Pittsburgh	30.00 to 31.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	19.25 to 22.25
Charcoal, Buffalo	19.00 to 20.00
Charcoal, Birmingham	21.50

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	$4.45
Mesabi Bessemer, 55 per cent, ton	4.20
Old range non-Bess., 51½ per cent, ton.	3.70
Mesabi non-Bess., 51½ per cent, ton	3.55

Eastern Ores.
(Per unit delivered eastern Pennsylvania.)

Pt. Henry fur., 60 per cent, unit.	8.6c to 8.9c
Local N. Y. and N. J. ores, unit.	8.5c to 8.75c
Port Henry lump, at mines, ton.	$4.00

Foreign Ores.
(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	8 to 8½
For'n non-Bess., 50 to 65 per cent.	8 to 8½

COKE

(At the ovens.)

Connellsville furnace	$3.50 to 3.75
Connellsville fur., contract	2.50 to 3.00
Connellsville foundry	3.75 to 4.00
Connellsville fdy. contract	3.50
Wise county furnace	2.85 to 3.10
Wise county foundry	3.25 to 3.50
Pocahontas furnace	2.75 to 3.00
Pocahontas foundry	3.00 to 3.25
New River, foundry	3.25 to 3.75
New River, furnace	3.00 to 3.25

FERRO ALLOYS AND STEEL MAKING METALS

Ferro mang., delivered (prompt)	$150
Ferro mang., Balti., (future)	125
Spiegeleisen 20 per cent, furnace	30.00 to 32.50
Ferro-silicon, 50 per cent, Pbgh.	83.00 to 85.00
Ferro-silicon, 50 per cent, Phila.	83.00 to 85.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $27.00; 10 to 11 per cent, $28.00; 11 to 12 per cent, $29.00; 12 to 13 per cent, $30.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-chrome, 4 to 6 per cent carbon, 25 cents per pound; 2 per cent carbon, nominal.

Ferro-vanadium, nominal, Pittsburgh.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

Nickel, nominal.

Ferro-tungsten, nominal.

Cobalt metal, nominal, Pittsburgh.

Aluminum, nominal, Pittsburgh.

Ferro-molybdenum, Pittsburgh, nominal.

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.40
From Pittsburgh	.619
From Youngstown	.619
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$40.00 to 42.00
Bessemer billets, Phila.	33.00 to 35.00
Forging billets, Phila.	50.00 to 55.00
Forging billets, Pbgh (nominal).	55.00
Forging billets, Chgo.	50.00 to 55.00
Wire rods, Pittsburgh (nom.)	50.00
Bessemer billets, Youngstown	34.00 to 35.00
Open hearth billets, Youngstown	35.00 to 36.00
Bessemer billets, Pittsburgh	34.00 to 35.00
Open hearth billets, Pittsburgh	35.00 to 36.00
Bess. sheet bars, Youngstown	34.00 to 35.00
Op. h'th sheet bars, Youngstown	35.00 to 36.00
Bess. sheet bars, Pittsburgh	34.00 to 35.00
Op. h'th sh. bars, Pbgh.	35.00 to 36.00
Op. h'th sh. bars, Pbgh.	35.00
Muck bar, Pittsburgh (nominal).	36.00

SKELP

Grooved steel skelp	1.85c to 1.90c
Sheared steel skelp	1.90c to 1.95c

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh. & Chg.	1.25c
Stand. op-h'th rails, Bbg. & Chg.	1.34c
Light rails, 8 to 10 lbs., Pbgh.	1.85c
Light rails, 8 lb., Chgo.	1.67c
Light rails, 12 to 14 lbs., Pbgh.	1.80c
Light rails, 12 lbs., Chgo.	1.62c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—

Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails 16 to 20 lbs., Pbgh.	1.75c
Light rails 16 to 20 lbs., Chgo.	1.57c
Light rails 25 to 45 lbs., Pbgh.	1.70c
Light rails 25 to 45 lbs., Chgo.	1.52c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect., Pbgh. base.	1.50c to 1.75c
Angle bars, st. sections, Chicago	1.50c to 1.75c
Spikes, railroad, Pbgh.	2.25c
Spikes, railroad, Chgo.	2.25c to 2.35c
Track bolts, Pbgh.	2.50c
Track bolts, Chgo.	2.60c to 2.80c
Tie plates, Chgo.	36.00

SHAPES, PLATES AND BARS

Structural shapes, Pbgh. (con.)	1.90c to 2.00c
Structural shapes, Chgo.	2.09c to 2.39c
Structural shapes, Philadelphia	2.059c to 2.159c
Structural shapes, New York	2.069c to 2.169c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chgo.	2.19c to 2.39c
Tank plates, Pbgh. (con.)	2.00c
Tank plates, Philadelphia	2.159c to 2.659c
Tank plates, New York	2.169c to 2.669c
Bars, soft steel, Pbgh.	1.90c to 2.00c
Bars, soft steel, Chgo.	2.09c to 2.39c
Bars, soft steel, Pbgh. (con.)	1.90c to 2.00c
Bars, soft steel, New York	2.069c to 2.169c
Hoops, carloads, Pbgh.	2.00c to 2.10c
Bands, Pittsburgh	1.90c
Shafting, Pbgh., contr. carloads	40 to 45 off
Bar iron, Chgo.	1.90c to 2.00c
Bar iron, Philadelphia	2.259c
Bar iron, New York	2.269c
Bar iron, Cleveland	2.25c
Bar iron, Pittsburgh	2.10c to 2.15c
Hard steel bars, Chgo.	1.90c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	2.60c to 2.75c
No. 28, black, Chgo.	2.79c to 2.94c
No. 28, tin mill, black, Pbgh.	2.50c
No. 28, galvanized, Pbgh.	4.75c to 5.25c
No. 28, galvanized, Chgo.	5.19c
No. 10, blue anl'd, Pbgh.	2.55c to 2.70c
No. 10, blue anl'd Phila.	2.709c to 2.909c
No. 10 Blue anl'd, Chgo.	2.94c
Tin plate, 100 lb., coke base	$3.75

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pick'ld, cold roll. and re-anld.	30 cents
Hot roll'd pickled and anl., tin mill.	25 cents
Full pickled, cold rolled and re-anld.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxiding	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free fr. mill scale	55 cents
Special open hearth deep stpg. steel, free from mill scale	80 cents
Extra deep special auto body stock.	1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black.	Galv.
	Butt-weld.	
Steel, ¼ to 3 inches	76	60½
Iron, ¼ to 1½ inches	66	48
	Lap-weld.	
Steel, 2½ to 6 inches	77	62½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	64
Iron, 3½ to 4½ inches l. c. l.	54

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails, jobbers' Pittsburgh	$2.20
Plain, wire, jobbers, Pittsburgh	2.05
Galvanized wire, jobbers, Pbgh.	2.75
Polished staples, Pbgh.	2.35
Galvanized staples, Pbgh.	3.05
Barb wire, painted, jobbers, Pbgh.	2.35
Barb wire, galv., jobbers, Pbgh.	3.05

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 70, cut threads 65 and 10; larger or longer, 60 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller or shorter, rolled 70 and 5; cut, 70; larger or longer, 60 and 10.

Cold pressed, semi finished hex. nuts, 75 and 10.

Gimlet and cone point lag bolts, 70 and 10. Hot pressed square, blank or tapped nuts, $4.00 off list; hot pressed hexagon blank or tapped, $4.20.

Cold pressed square, blank or tapped, $3.75 off; hexagon, blank or tapped, all sizes, $4.75.

RIVETS

Structural rivets, Pbgh	2.60c
Structural rivets, Chgo. delivery	2.75c
Boiler rivets, Pbgh	2.70c
Boiler rivets, Chgo. delivery	2.85c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.90c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	4.00c

COLD ROLLED STRIP STEEL

Base price $4.00 per 100 pounds, hard, coils 1¼ inches and wider and by .100 inches and heavier.

Extras.

.10 to .19 carbon. 1½ inches and wider.

	Coils. Hard.	Soft.
0.100 and heavier	Base	$0.25
0.050 to 0.099	$0.05	0.30
0.035 to 0.049	0.20	0.45
0.031 to 0.034	0.35	0.75
0.025 to 0.030	0.45	0.85
0.020 to 0.024	0.55	0.95
0.017 to 0.019	1.35	1.35
0.015 to 0.016	1.75	1.75
0.013 to 0.014	2.45	2.45
0.012	2.80	2.80
0.011	3.15	3.15
0.010	3.50	3.50

Lengths 24 Inches and Over.

	Hard.	Soft.
0.100 and heavier	$0.10	$0.35
0.050 to 0.099	0.20	0.45
0.035 to 0.049	0.35	0.60
0.031 to 0.034	0.60	1.00
0.025 to 0.030	0.85	1.25
0.020 to 0.024	1.05	1.45
0.017 to 0.019	2.45	2.45
0.015 to 0.016	2.85	2.85
0.013 to 0.014	3.70	3.70
0.012	4.30	4.30
0.011	4.65	4.65
0.010	5.00	5.00

Extras as per card of Jan. 1, 1916.

CAST IRON WATER PIPE

Four-inch, Chicago	$32.50 to 33.00
Six-inch and larger, Chicago	29.50 to 30.00
Six-inch Class B, New York	29.00
Four-inch, Class B, New York	32.00
Four-inch, Birmingham	27.00
Six-inch and larger, Birmingham	25.00

Light weight water and gas pipe, $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	2.50c
Steel squares, 2-in. & ov., Cleve.	2.75c
Steel rounds, 2 in. and over	3.10c
Steel bars, under 2 in., Cleveland	2.60c
Steel bars, Philadelphia	2.60c
Steel bars, New York	2.50c
Steel bars, St. Louis	2.55c
Steel bars, St. Paul	2.60c
Steel bars, over 2-inch, Buffalo	3.15c
Steel bars, Buffalo	2.45c
Iron bars, Chicago	2.30c
Iron bars, Cleveland	2.55c
Iron bars, St. Louis	2.50c
Iron bars, Cincinnati	2.40c to 2.45c
Iron bars, Philadelphia	2.60c
Iron bars, New York	2.50c
Hoops, Chicago	2.15c
Shapes and plates, Chgo.	2.60c
Shapes, Cleveland	2.60c
Shapes and plates, Buffalo	2.45c
Shapes and plates, Cincinnati	2.45c to 2.50c
Shapes and plates, St. Louis	2.65c
Shapes and plates, St. Paul	2.70c
Shapes, Philadelphia	2.50c
Shapes, New York	2.50c
Plates, Cleveland	2.70c
Plates, New York	2.70
Plates, Philadelphia	2.75c
No. 10 blue anl. sheets, Chgo.	2.80c
No. 10 blue anl. sheets, Clevel'd	3.00c
No. 10 blue anl. sheets, Buffalo	2.70c
No. 10 blue anl. sh., St. Louis	2.85c
No. 10 blue anl. sheets, Cinci.	3.00c to 3.15c
No. 10 blue anl. sheets, St. Paul	2.90c
No. 28 black sheets, Chgo.	3.00c
No. 28 black sheets, Cleveland	2.95c
No. 28 black sheets, Cincinnati	3.00c
No. 28 black sheets, St. Louis	3.20c
No. 28 black sheets, St. Paul	3.25c
No. 28 galv. sheets, Chgo.	4.80c to 5.00c
No. 28 galv. sheets, Cleveland	5.25c
No. 28 galv. sheets, Cincinnati	5.25c
No. 28 galvanized sheets, St. L.	5.25c

Freight Rates, Coke

Connellsville district, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.85
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

Arch bars and transoms, Chgo.	$18.25 to 18.75
Arch bars and transoms, St. L.	17.50 to 18.00
Angle bars, iron, Chicago	17.25 to 17.75
Angle bars, steel, St. Louis	14.00 to 14.50
Arch bars and transoms, Chgo.	18.00 to 18.50
Arch bars and transoms, St. L.	16.50 to 17.00
Cut forge, Chicago	14.25 to 14.75
Knuckles, coup., Chgo.	15.50 to 16.00
Knuckles, coup., St. L.	15.00 to 16.00
Locomotive tires, Chicago	16.00 to 16.50
Locomotive tires, St. Louis	15.00 to 15.50
Railroad wrought, No. 2, Chgo.	14.25 to 14.75
Railroad wrought, No. 1, Cleve.	14.50 to 15.00
Railroad wrought, No. 1, St. L.	15.00 to 15.50
Railroad wrought, No. 1, Cinci.	12.25 to 12.75
Railroad wrought, No. 2, Chgo.	14.25 to 14.75
Railroad wrought, No. 2, St. L.	15.00 to 15.25
Shafting, Chgo.	17.25 to 17.75
Shafting, St. Louis	17.00 to 17.50
Springs, Chgo.	16.25 to 16.50
Steel car axles, Chicago	21.75 to 22.25
Steel car axles, St. Louis	22.00 to 23.00
Pipes and flues, Chicago	11.50 to 12.00
Pipes and flues, Cleve'd (nom.)	11.25 to 11.75

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Boiler plate, cut, No. 1, Chgo.	11.50 to 12.00
Boiler plate, cut, No. 1, St. L.	7.00 to 7.50
Boiler punchings, Chicago	14.00 to 14.50
Busheling, No. 1, Chicago	12.50 to 13.00
Busheling, No. 1, Cleveland	13.75 to 14.25
Busheling, No. 1, Cincinnati	10.00 to 10.50
Busheling, No. 1, St. Louis	12.00 to 12.50
Busheling, No. 2, Chicago	9.25 to 9.75
Bundled sheet, Cincinnati	8.50 to 9.00
Cast borings, Chicago	7.75 to 8.00
Cast, No. 1, Cleveland	13.00 to 13.50
Cast, No. 1, Cincinnati	11.50 to 12.00
Cast, No. 1, St. Louis	9.50 to 10.00
Cast borings, Chicago	8.00 to 8.25
Cast borings, Cleveland	7.25 to 7.50
Cast borings, Cincinnati	7.50 to 8.00
Cast borings, St. Louis	7.50 to 8.00
Machine shop turnings, Chgo.	8.25 to 8.75
Machine shop turnings, Cleveland	6.75 to 7.00
Machine shop turnings, Cinci.	7.00 to 7.50
Machine shop turnings, St. L.	8.50 to 9.00
Malleable agricultural, Chgo.	12.00 to 12.50
Malleable agriculture, St. Louis	11.00 to 11.50
Malleable railroad, Chicago	14.00 to 14.25
Malleable, Cincinnati	8.00 to 8.50
Malleable railroad, St. Louis	12.50 to 13.00
Pipes and flues, Chgo.	11.75 to 12.25
Pipes and flues, St. Louis	11.00 to 11.50
Stove plate, Chicago	11.00 to 11.50
Stove plate, Cleveland	9.75 to 10.00
Stove plate, Buffalo	9.50 to 10.00
Stove plate, Cincinnati	8.00 to 8.50
Stove plate, St. Louis	10.00 to 10.50

(Gross tons.)

Boiler plate sheared, Buffalo	13.00 to 13.50
Busheling, No. 1, Buffalo	13.50 to 14.00
Busheling, No. 1, Pbgh.	14.50 to 15.00
Busheling, No. 2, Buffalo	11.00 to 11.50
Bundled sheet, Pittsburgh	14.50
Bundled sheet, Cleveland	12.50 to 12.75
Bundled sheet, Buffalo	12.00 to 12.50
Car wheels (iron), Pittsburgh	15.50 to 16.00
Car wheels (steel), Pittsburgh	18.00 to 19.00
Car wheels, Chicago	14.75 to 15.25
Car wheels, eastern Pa.	16.00 to 16.50
Car wheels, Buffalo	15.25 to 15.75
Car wheels, N. Y.	14.00 to 14.50
Car wheels, St. Louis	14.50 to 15.00
Cast borings, New York	9.25 to 9.50
Cast borings, eastern Pa.	11.50 to 12.00
Cast borings, Buffalo	9.25 to 9.75
Cast borings, Pittsburgh	11.25 to 11.50
Cast, No. 1, eastern Pa.	17.50 to 18.00
Cast, No. 1, Pittsburgh	15.00 to 15.50
Cast, heavy No. 1, N. J. points	16.00 to 16.50
Forge, No. 1, eastern Pa.	13.50 to 14.00
Frogs, switches, guards, Chgo.	15.50 to 16.00
Frogs, switches, guards, St. L.	16.00 to 16.50
Grate bars, Buffalo	11.00 to 11.50
Grate bars, N. J. points	12.75 to 13.00
Heavy axle turnings, Buffalo	12.00 to 12.50
Heavy melting steel, Pbgh.	17.50 to 18.00
Heavy melting steel, Buffalo	16.50 to 17.00
Heavy melting steel, Chicago	15.50 to 15.75
Heavy melting steel, Cleveland	15.75 to 16.25
Heavy melting steel, Cincinnati	14.25 to 14.75
Heavy melting steel, eastern Pa.	16.75 to 17.00
Heavy melting steel, New York	15.00 to 15.50
Heavy melting steel, St. Louis	16.00 to 16.50
Iron rails, Chicago	17.75 to 18.25
Iron rails, Buffalo	17.00 to 17.50
Iron rails, Cincinnati	14.00 to 14.50
Iron rails, St. Louis	16.00 to 16.50
Iron axles, Pittsburgh	25.00 to 26.00
Iron axles, Cincinnati	20.50 to 21.00
Iron axles, eastern Pa.	26.00 to 27.00
Iron rails, Chgo.	17.75 to 18.25
Iron axles, Buffalo	23.00 to 23.50
Iron rails, St. Louis	16.50 to 17.00
Iron rails, Cleveland (nom.)	17.00 to 18.00
Low phos. steel, Buffalo	20.50 to 21.00
Low phosphorus steel, Pbgh.	21.00 to 21.50
Low phos. steel, eastern Pa.	22.00 to 22.50
Machine shop turnings, Buffalo	7.75 to 8.25
Mch. shop turnings, New York	8.75 to 9.00
Mch. shop turnings, Pbgh.	10.00 to 10.50
Mch. shop turnings, eastern Pa.	10.75 to 11.00
Mall. railroad, Cleveland	16.25 to 16.50
Malleable railroad, Pittsburgh	15.00 to 15.25
Malleable railroad, Buffalo	15.25 to 15.75
Malleable railroad, eastern Pa.	14.50 to 15.00
R. R. and mch. cast, No. 1, Bfl.	15.25 to 15.75
R. R. wrought, No. 1, Buffalo	17.50 to 18.00
Railroad wrought, No. 1, E. Pa.	23.00 to 24.00
R. R. wrought, No. 1, New York	20.50 to 21.00
Railroad wrought, No. 1, Pbgh.	18.00 to 19.00
Reroll. rails, 5 ft. & ov., Pbgh.	18.75 to 19.00
Reroll. rails, 5 ft. & ov., Chgo.	17.50 to 17.75
Reroll. rails, 5 ft & ov., Cleve.	15.50 to 16.00
Reroll. rails, 5 ft. & ov., E. Pa.	19.00 to 20.00
Reroll. rails, 5 ft. & ov., St. L.	18.00 to 18.50
Shafting, New York	21.00 to 21.50
Shafting, eastern Pa.	23.00 to 23.50
Shoveling steel, Chicago	15.25 to 15.50
Shoveling steel, St. Louis	15.00 to 15.50
Steel rails, short, Chicago	17.00 to 17.50
Steel rails, short, Cleveland	18.00 to 18.25
Steel rails, short, St. Louis	16.00 to 16.50
Steel car axles, New York	22.00 to 23.00
Steel car axles, Buffalo	23.00 to 23.50
Steel car axles, Cleveland	22.00 to 23.00
Steel car axles, eastern Pa.	24.00 to 25.00
Stove plate, N. J. points	12.75 to 13.00
Stove plate, Pittsburgh	11.50
Stove plate, eastern Pa.	12.50 to 13.00
Wrought pipe, New York	13.75 to 14.00
Wrought pipe, Buffalo	13.00 to 13.50
Wrought pipe, eastern Pa.	16.00 to 16.50

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CONTENTS

PART I.—Manufacture and Use of Coke. Properties in Ores. Operations of Blast Furnaces. Different Brands of Pig Iron and How to Purchase and Use Them Intelligently.

PART II.—Elements in Cast Iron and Their Physical Effects—Utility of Chemical Analysis and How to Use Them in Making the Different Mixtures of Irons Used in Making Gray and Chilled Castings.

PART III.—Properties of and Methods for Testing Molten Iron. Discloses Phenomena in the Actions of Cooling Metal, etc. Presents Results of Tests in All Kinds of Irons and Best Methods for Testing.

Selected Tables of Utility for Furnace and Foundry Work

Penton's Book News
CLEVELAND, OHIO 37

Use of Wrought Manganese Bronze

(*Continued from page 234*)

hammered, and hair-cracks are nearly always present in the finished forging unless unusual care is observed.

Another maker uses one-half casting mixture and one-half forging mixture with the addition of a little extra manganese. A tensile strength of over 90,000 pounds is thus secured, but the objections noted above hold good also for this mixture. Still other manufacturers have increased the aluminum by several per cent, or the manganese or both, and have made additions of vanadium, titanium, etc., obtaining in this way a tensile strength as high as 125,000 pounds per square inch, but with an elongation seldom more than 20 per cent.

Any radical departure from the formulas given in the first part of this paper or the use of any but the purest materials, can only result in inferior manganese bronze. Safety is not found in extremely high tensile strength, but in great ductility and in the avoidance of excessive cold working. A tensile strength of, say, 70,000 pounds, should not be exceeded. Great ductility allows more leeway in forging, but cold work is always objectionable, as it may result in hidden ruptures, or, later on, in so-called "season cracking". No manganese bronze, however ductile, or in fact, no wrought non-ferrous alloy whatever, should be considered able to safely withstand excessive cold work that strains it above the elastic limit. The future should see a more extended use of wrought manganese bronze. Its physical characteristics warrant a wider field. If those who manufacture it make quality the first consideration and if those who use it specify it intelligently, it will find a wide application in the industrial arts.

State Adopts Foundry Regulations

(Continued from page 241.)

be located entirely in the rear part of the building, or to extend from the front to the rear, unless the ceiling shall be not less than 3 feet above the curb level of the street in front of the building, and the foundry shall open upon a yard or court which shall extend at least 6 inches below its floor level; nor unless proper and adequate provisions shall be made for lighting and ventilation.

Section 44.—In case any foundry that was legally operated in a cellar or basement on Oct. 1, 1915, shall be discontinued or closed by the department, it can thereafter be reopened as a foundry only by complying with the provisions of the regulations relating to future foundries. The occasional use of a foundry for the purpose of evading this regulation shall not be deemed a continuance of use thereof.

Cuban Iron Mines

The iron deposits of Cuba are practically all located within 25 miles of tidewater and mining and shipments are continuous throughout the year owing to the equable climate. These advantages are offset in a degree by the fact that ocean freight rates, import duties, port charges, etc., make some of the costs higher than they would be in the United States.

The principal iron ore deposits of Cuba are divided into two classes: The hard hematite and magnetite of the south coast mountains, and the soft brown hematite and limonite of the north coast of Camaguey and Oriente provinces. The south coast ore was originally exploited in 1884 by the Juragua Iron Co. Its mines are situated

in the hills, 10 to 15 miles east of Santiago de Cuba. About 5 miles farther east are the properties of the Spanish-American Iron Co., the largest of the mining concerns. Eight miles west of Santiago, the Ponupo Mining Co. at El Cuero has successfully operated since 1909.

The occurrence of the south coast ore is in irregular deposits usually small and broken up and mixed with siliceous rock. It is mainly a fine-grained magnetite intermixed with specular hematite. Diorite is the most common country rock. The ore is largely a low phosphorus as well as a low sulphur grade. In consequence of the interrupted structure of the ore bodies much waste rock must be handled. Careful preliminary exploration work is always undertaken to insure successful mining operations, and the work is systematically kept up well in advance of mining. Open-cut methods are employed. In the larger mines, steam shovels are operated for removing the overburden. The disposal of waste is simple, as the almost invariable location of the mines is along steep hillsides. Blasting is done at fixed hours, and great care is taken to avoid accidents of all kinds. Drilling in the larger mines is done by tripod drills, using steam or compressed air. The ore is loaded by hand into the mine cars on account of the necessity for sorting.

Two Main Groups of Deposits

Tungsten ores occur with a great many other ores, in Cuban deposits. The presence or absence of tourmaline divides the deposits into two main groups; those free from tourmaline are the more common. More important perhaps is the presence of sulphides. These are never absent, but their relative amounts are not sufficiently well known to make a satisfactory classification; they are mainly sulphides of iron and copper, together with the products arising from their alteration. The most important accompanying ores are molybdenite (San Virgilio, Los Coloraditos), and bismuthite or carbonate of bismuth (El Aguila, El Salado). Scheelite is generally found in small quantities. There is but one region—Mazan—where casiterite occurs with wolframite. The casiterite beds of Salvador do not contain wolframite; their formation belongs to an earlier stage (fissures and impregnations; no quartz-and-mica veins).

The main deposit occurs in the Los Condores mine, in the province of San Luis. The other mines are not of importance; some of them are abandoned, and others have not yet been worked. In Los Condores, the vein yields between 1 and 4 per cent of wolframite. The proportion diminishes as the depth increases (1.28 per cent). The average proportional yield of the other mines is not known. The following are the exports of wolframite ores for six years:

	Tons.
1908	349.64
1909	753.72
1910	708.57
1911	585.82
1912	637.17
1913	535.76

A Stockpile Trestle of Recent Design

(*Continued from page 232*)

wire strands. They extend out to side bents erected at 100 feet from the trestle, the guys from three center bents being attached to each side bent. The guys pass over the cap and down to eyebolts, passing through a 12 x 12-inch x 16-foot timber near the ground.

The side bents are 32 feet high, built of round timber and well braced. They are guyed by two ⅝-inch wire ropes to a "dead-man", concreted in the ground.

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(Each additional word set solid, 2c.—Each additional word all caps, 3c.)

Positions Offered

WANTED—DRAFTSMAN ACCUSTOMED to steam and gas engine work. Permanent position open to competent man. Give experience, reference and salary desired. Address Box 746, THE IRON TRADE REVIEW, Cleveland, O.

WANTED CHEMIST: — ASSISTANT chemist wanted for steel works in Ohio. Prefer one who has had experience with alloy steels. State age, and experience in full, also salary required. Address Box 739, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — A FIRST CLASS REPAIR man, capable of handling blowing room, with Turbine experience. Good wages will be paid to strictly temperate competent man. Address Box 740, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — MACHINE SHOP FOREMAN in city of 20,000 desirable surroundings, schools, churches, etc. Must be experienced in handling of men; full particulars, salary. Address Box 735, THE IRON TRADE REVIEW, Cleveland, O.

WANTED.

A Manager for a malleable iron plant located in the middle West. Must have successful record and be capable of handling all details, including the buying of materials, estimating costs and making contracts for a plant employing 500 men. Excellent opportunity for a live, progressive man. Only high grade man between 35 and 45 years of age will be employed. Application should cover above points fully. Address Box 745, THE IRON TRADE REVIEW, Cleveland, O.

A SECOND MAN FOR PURCHASING Department handling purchases from $3,000,000 to $4,000,000 per annum; principal commodities plates, shapes, bars and allied lines; coal, coke, pig iron and high and low pressure fittings. Preferably between the age of 28 and 35 and one who has had rolling mill experience. Applicants must state age, nationality, whether married or single, by whom employed and over what periods. All references and communications will be treated confidentially. Address Box 720, THE IRON TRADE REVIEW, Cleveland, Ohio.

WANTED—MACHINE SHOP FOREMAN capable of taking charge of machine shop and millwright department. Young man with technical education preferred. Answer at once giving a full outline of your experience, age, salary expected and when you could report for duty. Address Box 743, THE IRON TRADE REVIEW, Cleveland, O.

COLD ROLLERS ON 10-IN. MILLS UP to 4-in. wide. Paragon wire rollers on 8-in. mills. Shaped wire drawer up to 1-in. wide. Also good wire cleaner. Address Box 744, THE IRON TRADE REVIEW, Cleveland, O.

UNDERSIGNED COUNSEL WILL CONFIDENTIALLY negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $2,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Fl Niagara Square, Buffalo, N. Y.

Positions Offered

WANTED:—BUYER FAMILIAR WITH materials for machinery manufacturing, lists, blue prints, etc. The position is open to a capable man with executive ability. Address Box 734, THE IRON TRADE REVIEW, Cleveland, O.

THE BEST WAY TO GET A GOOD position in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

FOREMAN WANTED FOR IRON AND brass foundry in a live growing city of fourteen-thousand with excellent schools. Requirements, exceptionally clean record, high references, experience in all classes of modern foundry practice, production at low cost, ability to handle men with firmness and tact, must be non-union. State salary expected. Address Box 703, THE IRON TRADE REVIEW, Cleveland, O.

WANTED:—NON-UNION DRY FLOOR man to close dry sand molds in steel foundry. Good proposition to offer first class man. Address Box 748, THE IRON TRADE REVIEW, Cleveland, O.

WANTED AT ONCE, SEVERAL FIRST class draftsmen of general mill and blast furnace experience. State age, experience, present salary and salary wanted in first letter; also when available. Central location Pittsburgh. Address Box 749, THE IRON TRADE REVIEW, Cleveland, O.

WANTED AT ONCE, SEVERAL DRAFTSmen experienced in power plant and general piping work. State experience, present salary and salary wanted in first letter; also when available. Central location Pittsburgh. Address Box 750, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

CONTROLLER ENGINEER EXPErienced in design of automatic control apparatus desires mechanical or electrical engineering position with controller manufacturer or industrial works where such experience is desired. Address Box 718, THE IRON TRADE REVIEW, Cleveland, O.

SCANDINAVIAN MECHANICAL ENGIneer with very good experience in designing and building of smaller marine motors for crude oil, desires responsible position with manufacturing firm. Address Box 725, THE IRON TRADE REVIEW, Cleveland, O.

AS STEEL FOUNDRY FOREMAN AND Steel Blower; at present employed as foreman and steel blower; can handle one or two ton Converter; 12 years foreman and blowing steel handling all kinds of work. Address Box 731, THE IRON TRADE REVIEW, Cleveland, O.

MASTER MECHANIC OR SHOP FOREman: Experienced in steel plant, sheet mill, general repair shops, clay-working machinery. Now superintendent small machine shop and foundry. Expert mechanic, efficiency man. Address Box 747, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

ORNAMENTAL IRON AND STRUCTUral steel man; desires connection with iron or steel works, graduate civil and mechanical engineer. Can take financial interest and devote all my time to the business. Experienced in selling and contracting for building products, bridges and reinforcing steel, competent designer and estimator. Address Box 742, THE IRON TRADE REVIEW, Cleveland, O.

WOULD LIKE TO COMMUNICATE with malleable iron firm, desirous of an A-1 general foundry foreman or superintendent. Address Box 654, THE IRON TRADE REVIEW, Cleveland, O.

TECHNICAL GRADUATE (29) ROD, skelp, plate, blooming and cold mill experience. Former assistant master mechanic of large steel plant. At present superintendent of chemical Company. Address Box 717, THE IRON TRADE REVIEW, Cleveland, Ohio.

WANTED: POSITION BY MECHANICAL ENGINEER. Eighteen years' experience as die sinker and master mechanic. Address Box 716, THE IRON TRADE REVIEW, Cleveland, Ohio.

WANTED: — POSITION AS TRAFFIC manager.—Sober, steady, middle-age man, married, 17 years' railway experience in official capacity, wide experience in handling traffic matters before Interstate Commerce Commission and various State Commissions, familiar with rate situations in all territories, at present permanently employed, very best of references as to ability and character, desires permanent connection with manufacturing, jobbing or industrial concern. Address Box 710, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED. BY BLAST FURnace superintendent. Twenty years experience in the iron business. Good references. Address Box 728, THE IRON TRADE REVIEW, Cleveland, O.

BY-PRODUCT COKE OVEN ENGINEER —chemical and mechanical, nine years on construction, operation and repairs. Age 32, married and good references. Address Box 708, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman, or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

A-1 FURNACE MAN, 15 YEARS BLOWing and General Foreman, desires to go with good concern. Best of references. Address Box 640, THE IRON TRADE REVIEW, Cleveland, O.

AS GENERAL FOUNDRY FOREMAN; 30 years wide experience in steam and gas engines; tool machinery and architectural iron castings; up-to-date in all foundry practice; thoroughly experienced in loam, dry and green sand work; perfect in core work; wants to locate with large concern west of Chicago; open shop preferred, A-1 references. Address Box 738, THE IRON TRADE REVIEW, Cleveland, O.

CHEMIST, DESIRES POSITION IN laboratory of concern in Milwaukee or near vicinity. Experienced on iron, steel, special steels, alloys, iron ores, etc. Address Box 683, THE IRON TRADE REVIEW, Cleveland, O.